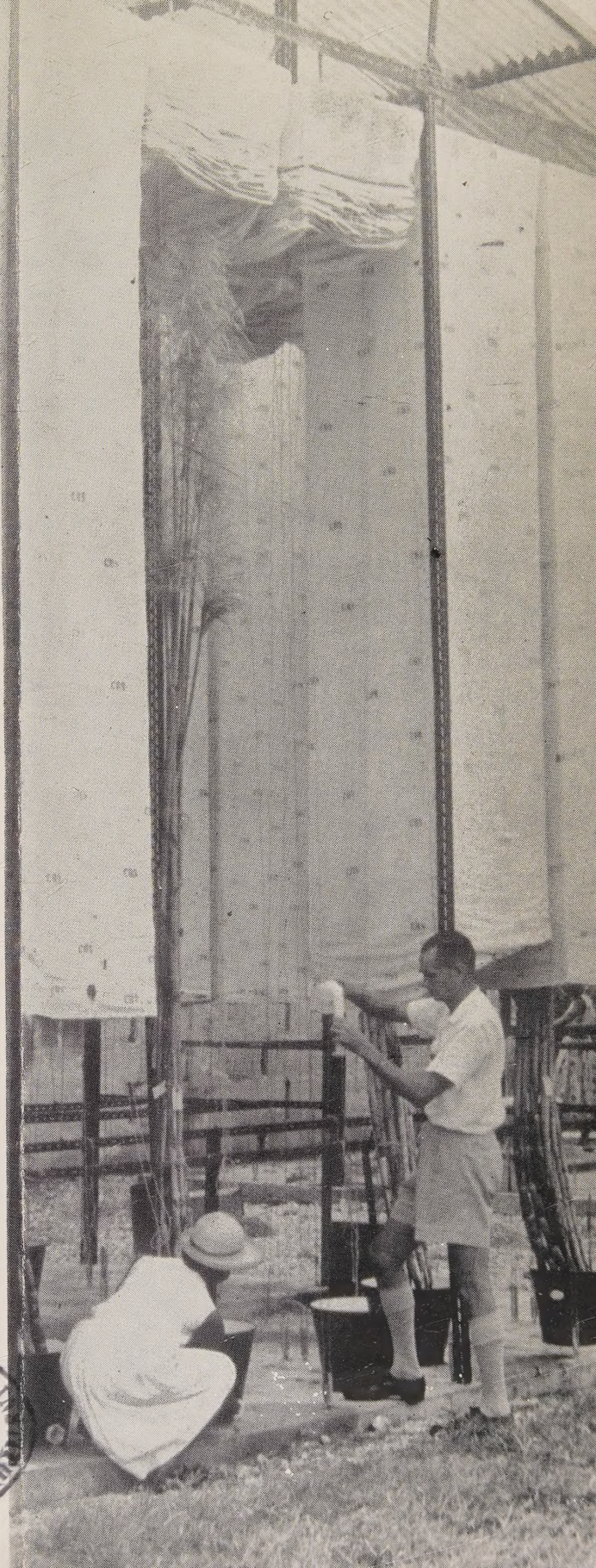
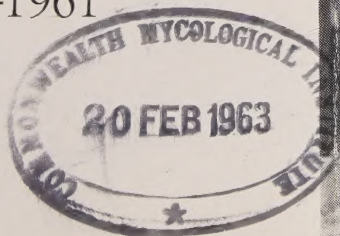


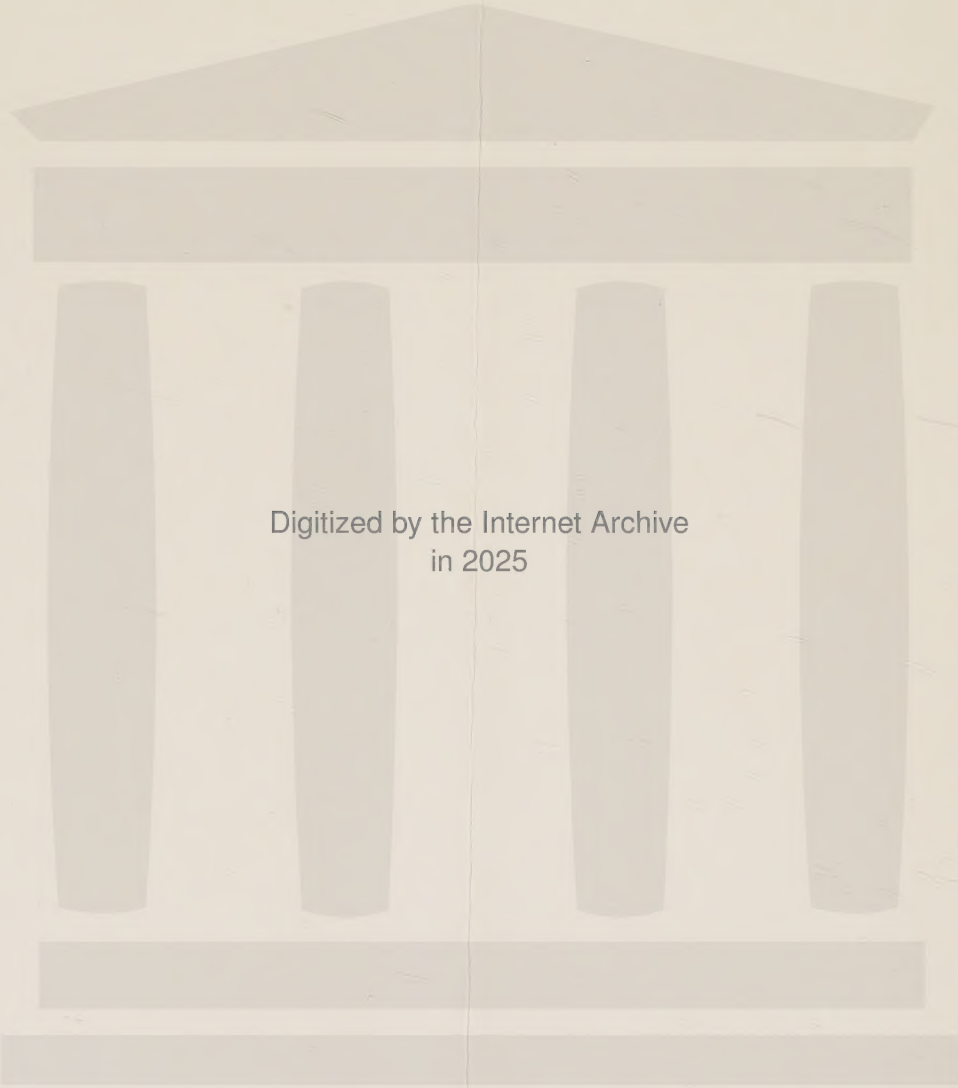
BRITISH WEST INDIES
CENTRAL
SUGAR CANE
BREEDING STATION
BARBADOS

TWENTY-EIGHTH
ANNUAL REPORT

1960-1961

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BRITISH WEST INDIES
CENTRAL SUGAR CANE
BREEDING STATION
BARBADOS



Twenty-Eighth Annual Report
for the year ending 30th September, 1961

TABLE OF CONTENTS

	<i>Page</i>
ADVISORY COMMITTEE & STAFF	5
INTRODUCTION	7
SUGAR CANE BREEDING — SEEDLING RAISING AND PRELIMINARY ELIMINATIONS	10
VARIETY TESTING	18
RESEARCH WORK	22
VARIETAL TRENDS IN CONTRIBUTING TERRITORIES ...	38
DISTRIBUTION OF VARIETIES TO CONTRIBUTING AND OTHER COUNTRIES	41
APPENDIX I	42
APPENDIX II	47
APPENDIX III	52

ADVISORY COMMITTEE

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ANTIGUA	...	...	...	<i>The Director of Agriculture.</i>
BRITISH GUIANA	...	...	...	DR. H. EVANS, O.B.E., <i>Director of Research, Bookers Sugar Estates, British Guiana.</i>
IMPERIAL COLLEGE OF TROPICAL AGRICULTURE				MR. PHILIP M. SHERLOCK, <i>Vice-Principal, U.C.W.I.</i>
JAMAICA	...	...	...	MR. R. F. INNES, <i>Director of Research, Sugar Manufacturers' Association (of Jamaica) Ltd.</i>
ST. KITTS-NEVIS	...	...	...	MR. H. H. CROUCHER, <i>Director of Agriculture.</i>
TRINIDAD	...	...	...	MR. L. L. DE VERTEUIL, <i>Chief Technical Officer (Agriculture), Ministry of Agriculture, Lands & Fisheries.</i>
WINDWARD ISLANDS			...	MR. W. H. HAGLEY, M.B.E., <i>General Manager, Woodlands Estate, Grenada.</i>

SIR JOHN SAINT, KT., C.M.G., O.B.E., (*Honorary Member*)

S T A F F

<i>Senior Geneticist</i>	...	...	...	G. C. STEVENSON, B.A., A.I.C.T.A.
<i>Geneticist</i>	...	...	...	D. I. T. WALKER, M.Sc.
<i>Botanist</i>	...	...	...	B. DEL. INNISS, B.Sc., A.I.C.T.A.
<i>Agricultural Assistants</i>	...	...	...	N. L. FOSTER.
				C. D. GILKES.
				A. N. C. HEWITT.
<i>Statistical Clerk</i>	...	...	...	E. L. JONES.
<i>Secretary</i>	...	...	...	MISS S. O. MAXWELL.

Introduction

Although the island rainfall for the year 1960 was comparatively low — 50.35 inches against a ten-year mean of 62.58 inches — it was fairly well distributed. In the important months of June, July and August, sufficient rain was received to permit of unrestricted early growth of canes, but the period September to November was rather dry, and the 1961 crop was affected accordingly, yielding only 159,541 tons of sugar compared with a ten-year average of 168,450 tons. So far as conditions for sugar cane breeding were concerned, the satisfactory early-season rainfall was favourable for arrowing, and it was possible to carry out a full crossing programme.

A considerable proportion of the crossing work was carried out with cut canes in preservative solution in the lantern batteries at Codrington. Improved methods were used for preparation and standardisation of the sulphurous-phosphoric acid solution, and the results, as judged by germination figures, were better than in previous years. The practice of cutting the ends of canes at intervals during the hybridisation and seed maturation periods has been discontinued. Crosses after setting up are now left undisturbed (since solution changes are made by removal of plastic bungs from enamelled containers) until those arrows destined for seed production are removed to the drying area. This results in greatly decreased casualties to the fragile arrows.

Low rainfall in November resulted in a shortage of rain-water, which is stored in tanks fed from guttered roofs, and which is used to prepare the preservative solution for cut arrows. Thanks are due to the Manager of Orange Hill Plantation, who kindly allowed us to take emergency supplies from his tanks. This situation emphasizes the necessity for an adequate reserve supply of rainwater to ensure carrying through a full breeding programme in future.

The programme included some interesting new crosses. The Indian *spontaneum* S.E.S. 205A, a 64-chromosome type of attractive growth habit and great vigour, was successfully nobilised in a cross with Ba.11569. This *spontaneum* is quite unlike the other 64-chromosome Indian type which we have (the Coimbatore local), in that it forms dense clumps without any tendency to rhizomatous tillering, and has thicker canes.

New breeding varieties introduced during the year after quarantine in Trinidad included the following:—

S. officinarum: six noble cane types from the 1951 collecting expedition to New Guinea.

S. spontaneum: (1) Moentai, an attractive type from Borneo, which has an aggressive rhizomatous tillering habit and is said to flower later than other *spontaneums*.

(2) 51 NG.2 and 51 NG.25, both 80-chromosome forms from New Guinea.

(3) C-4-6, a hybrid of the Burma *spontaneum* made in Fiji. This, while not of imposing appearance, is interesting as the Burma form flowers out of season, if at all, in Barbados, and so far we have been unable to use it in breeding.

- S. robustum*: Several types from the 1951 New Guinea expedition. These include 80-, 164- and 194-chromosome clones, as well as one which is said to have remarkably high brix.
- S. barberi*: Saretha, one of the historic clones of the species, which has not been represented in our breeding plots for many years.
- Commercial hybrids*: Several of the best recent varieties from Queensland, Hawaii, Mauritius, Puerto Rico, Cuba, Brazil and India.

The area available for breeding plots was increased appreciably during the year by the acquisition, on indefinite loan, of an adjoining piece of land about 4½ acres, part of the lands of Groves Agricultural Station. Thanks are due to the Ministry of Agriculture, Barbados, for making this area available.

Rainfall was supplemented by irrigation at times during the season, but there were holdups when the submersible electric pump had to be lifted for examination to locate a defect (which proved to be a broken lead) and when the source of power, a diesel alternator plant leased from the Government Irrigation Board, was not immediately available. Arrangements made during the year for a supply of Company's electric power to the site should ensure adequate irrigation facilities in future, and allow of carrying out certain experiments ancillary to the breeding programme.

The growth of seedlings in the early stages was exceptionally good. Perforated polythene pots were used on a considerable scale. They allowed of a much closer packing of seedlings in the cisterns than is possible with earthenware pots, and supported very good growth from the time in transplanting in February — March until the field nursery planting in May.

The potting and transplanting of a proportion of the seedlings in bunches was discontinued, as a result of conclusions from experiments reported in previous Annual Reports. However, seedlings surplus to the requirements of space-planting were not discarded: they were kept in the boxes, clipped several times, and eventually planted direct in the field nursery as large bunches to fill up odd corners and the ends of rows.

During the year we were able to welcome the Republic of Honduras to membership of the Station's organisation. This is the third foreign contributor we have in Central America — the others being Panama and Costa Rica. Some data on the use which is being made of Barbados varieties in foreign countries, both contributing to the Station and non-contributors, are given later in this Report.

The Senior Geneticist represented the Station at the Jamaica Meeting of B.W.I. Sugar Technologists in November 1960, where he presented a paper by Mr. Walker, Geneticist, entitled "Useful Information from Variety Trials", which will be published in the official Proceedings.

The Senior Geneticist was present by invitation at the Fifth International Meeting of the Instituto Tecnológico Azucarero Veracruzano, Mexico, in July 1961, where he delivered an invited paper — "Recent Developments in Sugar Cane Breeding".

The Geneticist visited Jamaica and La Romana, Dominican Republic, in March, 1961, for the purpose of discussing seedling testing and variety problems

with those responsible for the work in these two territories, both of which carry out seedling propagation and testing from the earliest stages with populations grown from "fuzz" (seed) supplied from Barbados.

Thanks are again due to the Director of Agriculture, Barbados, and his staff for facilities offered and assistance received during the year.

The following publications were issued:

- (i) STEVENSON, G. C. Recent Developments in Sugar Cane Breeding. Rept. Fifth Int. Meeting of Instituto Tecnologico Azucarero Veracruzano, Mexico, 1961.
- (ii) WALKER, D. I. T. — Cane Quality at Bulkeley Factory, 1961 Crop. Mimeographed.
- (iii) WALKER, D. I. T. — Variety Selection Work in Jamaica and at Central Romana Corporation, Dominican Republic. Mimeographed.

Sugar Cane Breeding — Seedling Raising and Preliminary Eliminations

(a) Sugar Cane Breeding:

The weather during the 1960 growing season was good in some areas and poor in others. Generally speaking, the northern part of the island received fairly good rainfall, as did the hilly districts. However, there was a definite shortage of rainfall in the southern part of the island, particularly during the period from October onwards. The reaping season was a particularly dry one in all parts of the island. Flowering at Groves was quite good, and a large breeding programme was undertaken. 101 crosses and 23 selfs and sib-crosses were made at Groves, while 131 crosses were done at Codrington by the solution technique. Seed from all crosses except the selfs and those done purely for breeding purposes, was divided equally between Barbados, Jamaica, La Romana and British Guiana.

(b) Seedling Raising, Potting and Planting in the Field Nursery:

Germination was satisfactory on the whole, both from Groves and Codrington. It is estimated that approximately 74,000 seedlings germinated. In addition to this, approximately 29,415 seedlings germinated in Jamaica, 37,796 in La Romana and 48,743 in British Guiana, making a total of ca. 190,000 for the year.

Table I gives, under group heads, a list of the numbers of crosses made, the numbers of seedlings germinated and the numbers planted in the First Year Seedling Nursery. Details are given in Appendix I.

TABLE 1.

SUMMARY OF BREEDING PROGRAMME 1960—61 FOR THE B.63' SERIES

GROUP	No. of Crosses Attempted	No. Germina- ted	NO. PLANTED IN FIELD NURSERY	
			Singles	Bunches
<i>S. officinarum</i> x <i>S. spontaneum</i>	15	2,972	2,098	27
<i>S. officinarum</i> x <i>S. barberi</i>	1	0	—	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> ...	135	44,615	28,640	512
<i>S. officinarum</i> x <i>S. sinense</i>	2	0	—	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>	6	224	222	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>	46	9,055	6,372	65
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>	4	345	339	—
<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i> ...	1	0	—	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>	9	1,992	475	135
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i> x <i>S. robustum</i>	3	2,654	153	298
Open pollinated	5	2,060	—	103
TOTALS	227	63,917	38,299	1,140
<i>Ss</i> lfs and Inbreds for Research Programme ...	21	10,312	1,957	204
GRAND TOTALS	248	74,229	40,256	1,344

It will be noted that the number of seedlings raised from crosses involving *S. sinense* in their breeding was again high. This follows the observation that a large proportion of the most promising seedlings selected in recent years have had sinense 'blood' in their breeding.

For the first time plastic bags were used for potting on quite a large scale. The seedling growth in these was superior to that in clay pots and no chlorosis was observed. At field planting they were very convenient, but field survival was not good because it was later clear that they demand a different planting technique. Tins were also used for a few families later in the season. The seedlings from tins were small when planted into the field, and as a result suffered excessive root disturbance. May was exceedingly dry, and with the limited irrigation possible, field survival was poor in many families. A check in July showed that at least 6% of seedlings had failed to establish.

(c) Planting the First Year Trial — B.62' Series:

The seedlings of this series were bred in 1959, potted and planted in the Field Nursery in May 1960. In October 1960, the seedlings in the Field Nursery were examined, and unsuitable types were eliminated. The remainder, 5,369 seedlings were planted in the First Year Trial. As in recent years, a stool of the standard variety, B.41211, was planted every fifth stool throughout the trial for purposes of comparison.

Table II gives, under group heads, the numbers of crosses made, the numbers of seedlings in the First Year Nursery and the numbers of seedlings planted in the First Year Trial. Details are given in Appendix II.

TABLE II.

SUMMARY OF NURSERY SELECTION FOR THE B.62' SERIES

GROUP	No. of Crosses	No. PLANTED IN THE FIELD NURSERY		No. Planted in First Year Seed- ling Trial
		Singles	Bunches	
<i>S. officinarum</i>	1	215	211	280
<i>S. officinarum</i> x <i>S. spontaneum</i>	9	1,440	—	259
<i>S. officinarum</i> x <i>S. sinense</i>	1	2	—	2
<i>S. officinarum</i> x <i>S. robustum</i>	2	548	355	40
<i>S. officinarum</i> x <i>S. spontaneum</i>	8	964	11	154
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> ...	74	12,043	1,603	3,275
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i> ...	2	18	—	9
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>	36	7,427	1,831	1,636
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>	5	1,088	—	233
<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i> ...	1	161	—	34
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>	5	836	63	91
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i> x <i>S. robustum</i>	1	168	—	72
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i> x <i>S. robustum</i>	2	731	—	138
TOTALS	147	25,641	4,074	6,323

(d) Reaping the First Year Trial — B.61' Series:

The seedlings of this series were bred in 1958, potted and planted in the Field Nursery in May 1959, and into the First Year Trial in October 1959. The trial (single stools) was cut in February 1961.

There was no change in the selection methods. The seedlings were cut, cleaned, bundled and laid out for inspection. Selection was made initially on appearance, and was based to some extent on comparison with the neighbouring stools of the standard variety. After selection, the following data was taken:— (1) number of canes per stool; (2) number of rotten canes per stool; (3) percentage arrowing; (4) weight in lb.; and (5) hand refractometer brix reading. The latter readings were calculated as the means of samples from the middle of all millable canes in the stool, thus removing any bias on the part of the scaleman in selecting canes for brix sampling. All seedlings from which data are taken are designated "Field Selections". However, if the brix does not reach a certain standard, the seedling is discarded in the field. Later, a further selection is made after consideration of the field data. Any varieties which come through this stage are known as "Final Selections", and are planted in multiplication plots, with a view to their being planted in Second Year Trials or in the Breeding Plots during the following planting season.

In this series, 360 final selections were made. B.41211 planted as a standard variety every fifth stool throughout the trial gave the following average results:—

Canes per Stool	...	...	...	13.6 ± 4.4 canes
Lb. per Stool	...	...	...	33.0 ± 14.2 lb.
Brix	...	...	...	$20.8^{\circ} + 1.2^{\circ}$

Final selections varied from 26 — 104 lb., and all had a brix above 21° . Details are given in Appendix III.

(e) Planting the Second Year Trials — B.60' Series:

The 352 final selections of this series were multiplied in ten-stool plots at Codrington. Single cuttings of each of these varieties were sent to Jamaica, British Guiana and La Romana for selection under their conditions. A further selection in October 1960 reduced this number to 252, and these were planted in Second Year Trials. In these trials, the plot size is nine stools; the new varieties are divided into groups of 18 and these together with two standard varieties are replicated three times. Each variety is planted in a trial in the low rainfall area, and in a duplicate trial in the high rainfall area, so that each variety is eventually represented by 54 stools, 27 in the high and 27 in the low rainfall areas.

(f) Reaping the Second Year Trials — B.59' Series:

The 141 varieties of the B.59' series were cut as plant canes in Second Year. Trails at the low rainfall estates, Bromefield and Bushy Park, and in duplicate trials at the high rainfall estates, Guinea and Castle. Twenty selections were made in all, fifteen of which will be tested further in Barbados. The performances of the standards and selected seedlings are given in Tables III and IV.

TABLE III.
SECOND YEAR TRIALS — B.59' SERIES — GROUPS I TO IV
PLANT CANES

Low Rainfall Trial (L) ca 51" — BROMEFIELD — Cut 2nd & 3rd March, 1961

High Rainfall Trial (H) ca 60" — GUINEA — Cut 15th & 17th March, 1961

VARIETY	PARENTAGE	NO. OF CANES PER STOOL (ROTTEN)		ARROWING		H.R. BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.37161	Standard	14.9 (1.6)	—	10%	—	21.2	—	37.9	—
B.41211	Standard	14.7 (2.1)	—	1%	—	22.0	—	33.9	—
B.45151	Standard	—	23.0 (1.2)	—	1%	—	22.5	—	55.5
B.4744	Standard	—	22.1 (1.4)	—	3%	—	21.6	—	67.8
B.5923	B.3365 x B.49119	128 (mod.)	103 (sli.)	light	mod.	101	95	124	90
B.5928	B.3365 x B.49119	120 (mod.)	96 (mod.)	light	heavy	106	99	132	71
B.5944	B.35207 x B.53218	109 (mod.)	84 (mod.)	light	mod.	97	98	135	79
B.5969	B.37161 x B.51242	101 (mod.)	76 (sli.)	light	heavy	102	97	127	77
B.5970	B.37161 x B.51242	101 (mod.)	71 (mod.)	light	light	94	92	169	91
B.5976	B.37161 x POJ.2878	107 (bad)	84 (bad)	heavy	heavy	107	95	118	52
B.5992	B.4145 x NCo.310	139 (mod.)	86 (sli.)	heavy	heavy	108	99	118	54
B.59104	B.42279 x B.41211	180 (sli.)	73 (mod.)	heavy	heavy	100	104	134	66
B.59117	B.4362 x B.4098	108 (mod.)	89 (sli.)	nil	light	106	110	110	84

Notes:— Performances of the standards are given as the averages of all groups involved. Those of the seedlings are expressed as a percentage of the standards, B.41211 (L) and B.4744 (H) in their own groups. Rotten canes and arrowing are not closely compared with the standards, but are grouped as follows:—

ROTTEN CANES:— Nil; 1—4% slight; 5—10% moderate;
11—20% bad; over 20% serious.

ARROWING:— Nil; 1—10% light; 11—25% moderate;
over 25% heavy.

TABLE IV.

SECOND YEAR TRIALS — B.59' SERIES — GROUPS V TO VIII
PLANT CANES*Low Rainfall Trial (L) ca 47" — BUSHY PARK — Cut 15th & 16th Feb., 1961**High Rainfall Trial (H) ca 57" — CASTLE — Cut — 22nd & 24th March, 1961*

VARIETY	PARENTAGE	NO. OF CANES PER STOOL (ROTTEN)		ARROWING		H.R. BRIX		TONS CANE PER ACNE	
		L	H	L	H	L	H	L	H
B.45151	Standard	18.3 (0.8)	20.1 (1.6)	—	—	23.0	23.7	21.2	43.8
B.4744	Standard	13.6 (0.6)	15.9 (1.8)	—	4	23.1	22.9	22.5	45.4
B.59136	B.53358 x B.51353	107 (mod.)	99 (mod)	nil	nil	97	98	104	98
B.59137	B.53358 x B.51353	82 (mod.)	95 (mod.)	nil	sli.	89	97	80	107
B.59159	B.45170 x B.49119	137 (sli.)	127 (mod.)	nil	heavy	108	114	118	85
B.59162	B.45154 x B.46364	103 (nil)	106 (mod.)	nil	light	99	102	118	105
B.59176	B.5055 x B.45151	109 (mod.)	138 (bad)	light	light	106	104	102	97
B.59189	B.51311 x B.49119	105 (sli.)	117 (bad)	nil	light	90	95	127	128
B.59215	Co. 421 x B.4995	115 (sli.)	135 (mod.)	light	light	92	97	106	99
B.59233	POJ.2878 x B.41227	128 (sli.)	135 (mod.)	nil	nil	98	96	129	107
B.59241	M.134/32 x B.41227	96 (sli.)	84 (mod.)	nil	mod.	98	98	106	84
B.59243	Trojan x B.4098	61 (bad)	67 (mod.)	sli.	mod.	96	94	71	102
B.59248	Trojan x B.4098	92 (sli.)	92 (bad)	nil	nil	100	102	81	78

The Standard used in both rainfall categories in these trials was B.4744.

See notes below TABLE III.

(g) Reaping the Second Year Trials — B.58' Series — First Ratoons:

The seedlings of this series were cut as First Ratoons at the low rainfall estates, Foursquare and River, and in duplicate trials at the high rainfall estates, Pool and Bowmanston. As a result of these trials four further selections were made, and it was possible to recommend that two of the original selections be discarded on a basis of their ratoon performances. Results are given in Tables V and VI relative to B.41211 (L) or B.4744 (H).

TABLE V.

SECOND YEAR TRIALS — B.58' SERIES — GROUPS I — V — FIRST RATOONS

*Low-Rainfall Trial (L) ca. 36" — FOURSQUARE — Cut 6th & 7th March 1961**High Rainfall Trial (H) ca. 50" POOL — Cut 17th & 18th March 1961*

VARIETY	PARENTAGE	NO. OF CANES PER STOOL (ROTTEN)		ARROWING		H. R. BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.37161	Standard	12.3 (1.1)	—	0	—	23.1	—	22.9	—
B.41211	Standard	13.3 (1.7)	—	0	—	22.4	—	21.0	—
B.45151	Standard	—	12.6 (6.5)	—	0	—	23.8	—	27.1
B.4744	Standard	—	14.6 (1.9)	—	2	—	22.5	—	48.0
B.5801*	B.3365 x B.51321	148 (bad)	55 (ser)	nil	light	109	102	84	41
B.5802	B.3439 x B.3337	130 (mod)	90 (bad)	nil	heavy	108	100	137	71
B.5809	B.3439 x B.37193	128 (mod)	68 (ser)	nil	light	106	99	160	70
B.5840 #	B.37161 x c.412	—	90 (ser)	—	heavy	—	110	—	82
B.5863	B.4145 x B.41211	133 (bad)	87 (ser)	nil	nil	102	94	141	86
B.5874	B.42279 x B.3337	120 (sli)	144 (mod)	nil	heavy	102	94	122	80
B.5891	B.4362 x POJ.2878	61 (ser)	93 (mod)	nil	heavy	97	106	53	81
B.58109	B.4906 x B.4098	69 (ser)	129 (mod)	nil	nil	105	103	45	83
B.58112	„ x „	150 (mod)	116 (mod)	nil	mod.	97	96	106	70
B.58114	„ x „	112 (mod)	108 (bad)	nil	nil	100	104	82	79

*Recommended to be discarded.

#Selected for breeding plots only.

See also notes below TABLE III.

TABLE VI

SECOND YEAR TRIALS — B-58" SERIES — GROUPS VI — IX — FIRST RATOONS

*Low Rainfall Trial (L) ca. 40" — RIVER — Cut 29th February & 1st March 1961**High Rainfall Trial (H) ca. 50" — BOWMANSTON — Cut 4th, 7th & 8th March 1961*

VARIETY	PARENTAGE	NO. OF CANES PER STOOL (ROTTEN)		ARROWING		H.R. BRIX		TONS CANE PER ACRE	
		L	H	L	H	L	H	L	H
B.37161	Standard	14.2 (0.4)	—	0	—	22.2	—	24.8	—
B.41211	Standard	15.3 (0.3)	—	0	—	21.3	—	22.0	—
B.45151	Standard	—	16.6 (2.1)	—	0	—	23.7	—	41.9
B.4744	Standard	—	16.2 (1.8)	—	1	—	22.9	—	54.3
B.58131#	B.5037 x B.41211	143 (sli)	143(mod)	nil	light	97	98	133	114
B.58137	B.50126 x B.42231	116 (sli)	135 (mod)	light	heavy	108	104	109	88
B.58141	B.50126 x B.42231	137 (sli)	130 (mod)	light	light	100	100	123	110
B.58143	B.50210 x B.34104	111 (sli)	125 (mod)	nil	light	103	105	88	91
B.58150	B.50215 x B.42231	106 (sli)	93 (mod)	nil	mod	108	105	134	62
B.58165	B.5142 x B.4098	81 (sli)	94 (mod)	nil	mod	105	102	89	69
B.58166	B.51311 x B.4098	101 (sli)	96 (mod)	nil	mod	105	97	107	65
B.58169*	B.51129 x B.4098	79 (mod)	90 (bad)	nil	light	110	102	51	57
B.58176	B.50214 x B.4098	96 (sli)	85 (mod)	nil	mod	106	97	96	56
B.58206#	H.32-8560x B.45151	—	75 (mod)	—	nil	—	107	—	74
B.58210#	M.134/32 x B.34104	—	102 (mod)	—	light	—	99	—	79
B.58230	Trojan x B.4098	158 (sli)	124 (mod)	nil	mod	100	107	172	87

*Recommended to be discarded.

#Selected for breeding plots only.

See also notes below TABLE III.

Variety Testing

(a) Third Year Seedling Trials:

These trials are intended to screen the selection of each series more thoroughly, so that any which come up to the performance of the standard varieties may be considered for final testing in Select Seedling Trials, and for commercial cultivation in Barbados. The layout of these trials takes the form of six randomised blocks, with a plot size of twenty cane holes, or approximately 1/87th of an acre. Sample bundles are taken from two of the six blocks for sucrose-in-juice determinations. This is the first stage at which mill data are recorded in the testing schedule.

(i) Plant Canes — B. 57' Series:

Of the varieties of the B.57' Series included in these trials, two — B.5736 and B.57150, have shown some promise as plant canes of becoming commercial varieties in Barbados. They both have good commercial field characters as well as possessing very good quality juices. B.5787 and B.5789 have given very good yields of plant cane, but their juices are both poor. B.5791, of which much was expected, has an excellent habit and quite a good juice, but does not yield heavily enough to compete successfully as a plant cane with the commercial varieties. B.5712 gave a heavy yield in the high rainfall area, but its juice quality was very poor. B.5743 also gave good plant cane yields of average juice quality. Details are given in Table VII.

TABLE VII

THIRD YEAR TRIALS — B.57' SERIES — PLANT CANES

<i>Estate ... Reaping Date ... Rainfall ...</i>	Hope 28th Feb. ca 59"	Coverley 27th Feb: ca 40"	Bulkeley 23rd Feb: ca 51"	Portland 1st Mar: ca 60"	Guinea 10th Mar: ca 65"
TONS CANE PER ACRE (MILL EXTRACTION %)					
B.37161 ...	31.1 (65)	19.7 (68)	—	—	—
B.41211 ...	24.1 (68)	19.7 (68)	—	—	—
B.41227 ...	26.9 (67)	19.1 (65)	38.5 (66)	—	37.5 (67)
B.45151 ...	—	—	34.1 (66)	47.5 (66)	43.4 (66)
B.4744 ...	27.4 (65)	—	42.9 (65)	49.2 (65)	43.4 (65)
B.5712 ...	29.4 (63)	17.9 (63)	42.2 (65)	50.0 (64)	41.1 (65)
B.5736 ...	31.3 (66)	17.4 (64)	42.8 (65)	—	44.9 (67)
B.5743 ...	34.6 (69)	24.0 (69)	21.8 (67)	—	42.9 (70)
B.5787 ...	37.1 (65)	26.4 (63)	44.5 (64)	48.4 (60)	43.8 (65)
B.5789 ...	35.0 (65)	20.3 (68)	39.8 (66)	49.5 (65)	44.2 (66)
B.5791 ...	31.5 (67)	24.1 (67)	41.0 (67)	—	37.8 (66)
B.57146 ...	16.7 (68)	11.7 (66)	36.2 (67)	—	42.7 (64)
B.57150 ...	33.8 (68)	21.1 (65)	39.2 (67)	48.7 (66)	41.8 (69)
B.57156 ...	—	21.2 (69)	36.4 (68)	—	38.9 (69)
SUCROSE IN JUICE (PURITY)					
B.37161 ...	16.9 (86)	18.6 (86)	—	—	—
B.41211 ...	18.5 (86)	17.5 (78)	—	—	—
B.41227 ...	18.2 (84)	20.2 (83)	20.5 (87)	—	19.0 (88)
B.45151 ...	—	—	20.4 (88)	18.3 (81)	20.3 (89)
B.4744 ...	17.9 (84)	—	19.4 (88)	18.3 (82)	18.8 (88)
B.5712 ...	15.9 (81)	16.7 (84)	17.0 (83)	15.9 (77)	17.3 (84)
B.5736 ...	18.9 (84)	20.0 (84)	20.7 (87)	—	19.2 (85)
B.5743 ...	18.6 (89)	19.1 (86)	16.8 (85)	—	18.7 (87)
B.5787 ...	17.2 (82)	17.9 (80)	18.7 (85)	17.6 (79)	18.5 (85)
B.5789 ...	16.7 (85)	16.8 (82)	18.0 (85)	16.3 (77)	18.0 (86)
B.5791 ...	16.6 (83)	20.3 (88)	20.6 (88)	—	18.8 (87)
B.57146 ...	16.8 (81)	17.8 (83)	19.2 (84)	—	18.6 (85)
B.57150 ...	18.4 (83)	20.8 (86)	20.9 (88)	19.9 (85)	21.0 (90)
B.57156 ...	—	17.5 (81)	18.6 (83)	—	17.7 (83)

After reaping conditions remained very dry.

At Coverley, the first ratoon springback almost failed in several varieties. Details are shown in Table VIII.

TABLE VIII

SUPPLIES NEEDED IN 20 STOOL PLOTS OF FIRST RATOONS B.57' SERIES
— COVERLEY 7/9/61 AVERAGES OF 6 PLOTS

B.5712	—	9.7	B.57146	—	8.2
B.5736	—	5.5	B.57150	—	0.3
B.5743	—	4.5	B.57156	—	3.0
B.5787	—	2.2	B.37161	—	9.3
B.5789	—	1.0	B.41211	—	6.8
B.5791	—	5.5	B.41227	—	2.7

L.S.D. (P = 0.01) : $\pm$ 3.9 supplies

The differences between varieties are marked, and well worth recording in this instance since failure of springback is definitely a character of economic importance. B.57150 is outstandingly better than B.41211, the present standard variety for the Coverley area. (cf. Table VII).

(ii) First Ratoons — B. 56' Series:

None of the varieties of this series was considered to be worthy of inclusion in Select Seedling Trials.

(iii) Second Ratoons — B. 55' Series:

None of the varieties of this series was considered to be worth testing beyond the first ratoon stage.

(b) Select Seedling Trials:

In these trials, the layout is in the form of a 5 x 5 latin square, with a plot size of approximately 1/40th of an acre. Sample bundles are taken from each plot, and a complete analysis of the cane is made, which gives, among other data, tons sugar per acre; per cent sucrose in cane; per cent fibre in cane; and juice purity.

(i) Plant Canes:

The severe drought during 1959 resulted in a shortage of planting material, and only one select Seedling Trial could be planted. It was decided to site this trial on the valley soils of the intermediate rainfall area, as there are not many suitable varieties available for this area. B.54142 maintained its promise, and gave a very good yield of cane and sugar. This trial was unfortunately heavily attacked by rats, some varieties suffering more than others. The standard variety, B.45151, was the worst affected, and this is reflected in the poor cane yield and the large number of rotten canes found. B.52107 and B.5401 also suffered heavily. It is proposed to protect this trial from rats during the growth period of the ratoon crop.

(ii) Second Ratoons:

The two trials in the high rainfall areas to test the new varieties, B.50112, B.52107 and B.52298, were cut during the past crop. The results of these trials are given in Table IX. B.50112 proved to be most difficult to cut and clean and, in addition, it was not outstanding. B.52107 suffered heavily from rat damage in the plant cane trial at Portland. The stalks of this variety are large, and when one is cut by a rat, a relatively high percentage of the crop is lost. B.52298 gave good yields of cane in both trials, but the juice quality was inclined to be poor. Apart from the plant cane trial at Portland, the performance of B.52107 was quite satisfactory, and it can be recommended for commercial cultivation in the high rainfall area. It will also be tested in the intermediate rainfall area and on the valley soils. Its juice quality is comparable with B.4744, and its low fibre may be a useful factory characteristic when mixed with thin canes such as B.45151 and B.49119. It is an easy cane to reap, generally being erect.

TABLE IX

SELECT SEEDLING TRIALS: AVERAGE OF PLANT CANE AND TWO RATOONS.

	B.45151	B.4744	B.50112	B.52107	B.52298	LSD P=0.05
<i>PORTLAND</i> ca. 57" rain p.a.						
Tons cane per acre ...	40.22	41.24	36.94	39.70	42.87	n.s.
Available sucrose % juice	20.9	18.9	18.6	18.5	17.4	1.3
Fibre % cane ...	15.8	15.6	15.6	13.3	14.8	n.s.
Rotten canes per plot ...	14	15	18	28	22	—
Tons sugar per acre ...	5.46	5.15	4.62	5.19	5.18	n.s.
<i>HOTHERSAL</i> ca. 68" rain p.a.						
Tons cane per acre ...	35.54	44.08	39.21	47.21	43.93	3.08
Available sucrose % juice	19.8	18.4	18.4	18.0	17.4	1.4
Fibre % cane ...	15.7	15.2	15.0	12.8	13.9	0.7
Rotten canes per plot ...	82	23	33	21	24	—
Tons sugar per acre ...	4.60	5.36	4.86	5.99	5.30	0.68

Research Work

I. The Inbreeding Programme:

Selfings were made both in the field at Groves, where specially-designed selfing lanterns were used, and by the solution technique in the batteries at Codrington. The latter method is perhaps the most expeditious, since arrows destined for selfing can be used at the same time with safe 100% females in area crosses.

Some of the most interesting selfings were those of b.22272, from which a large population of sixth-generation selfs was obtained, and of j.17 and j.37, examples of the rare thick-stemmed and broad-leaved derivatives in the lines from B.4362. Both these also gave large selfed populations, from which it is hoped to select high-brix individuals for continuation of the lines. Test-selfings of two commercial-type hybrids, B.49257 (B.37161 x B.4098) and B.52107 (B.4145 x B.41227) gave very different seedling populations. From the former, seedlings were of good vigour and appearance, and almost 50% were selected from the field nursery for further commercial testing — a percentage considerably higher than the average for out-crosses. From B.52107, on the other hand, although it is a better variety itself than B.49257, and is in fact coming into commercial cultivation in Barbados, the selfs were of a poor standard generally. Less than 18% were selected from the field nursery.

More than 2,000 selfed seedlings were planted in the field nursery, and just over 1,500 seedlings from top-crosses (inbreds crossed with commercial varieties or standard breeding canes). Since the field nursery usually contains well over 30,000 seedlings, it will be evident that the inbreeding programme still represents but a small proportion of the breeding work.

Selections from the previous season's nursery, planted in the breeding plots, included selfs from B.4744, Eros and Co.421, which are new foundation parents in the inbreeding work.

As explained in last year's Report, the inbreds are used in top-crosses with varieties of proven breeding value. The experience with them has confirmed the expectation that their use will not result in an immediate short-cut to higher field yields. Indeed no short-cut is necessary to higher cane yields alone, since these are easily achieved in a normal out-crossing programme, and are not the objective of our breeding work. Our improved commercial varieties owe their success to a favourable gene balance producing heterosis. Such heterosis for yield must be combined with other desirable characters, such as a capacity to elaborate and store sucrose, and to resist diseases. These latter characters are likely to be more simple genetically, and, although polygenic, would appear to be controlled by simple dominance systems rather than by epistasis. It is these, therefore, that are likely to be fixed by inbreeding, and this would account for the potential value of inbreds. Selection for yield characters would be little altered, it is thought.

Judging by the results obtained, the best inbreds so far used in top-crosses have been in lines from the foundation parents B.3337, B.37161, B.4098 and B.41211. However, different inbreds from the same foundation parent are found to differ considerably in the calibre of their seedlings in crosses with the same variety, a fur-

ther indication that the approach to homozygosity is slow in this polyploid and aneuploid material. If selection in inbred families favours the heterozygous individuals, there will be *no* approach to homozygosity.

A self has been recognized (and corroborated cytologically) in a seedling population from Ba.11569 x *S. spontaneum* S.E.S. 205A. The female parent, a 'noble' variety, is known as one of the safest male-sterile clones, with virtually 100% yellow, shrivelled, indehiscent anthers — but sugar cane breeders are aware that normal anthers are occasionally produced in such varieties. The Coimbatore breeders use as female varieties with as much as 40% open anthers (Co.213) according to Dutt and Rao, "Coimbatore Canes in Cultivation", published in 1956. They even use POJ.2878, with 90% open anthers, as a female, but make some attempt to control fertilisation by dusting early. The success of this must be questionable. The possibility that Co.421, a seedling from such a cross, might be a self of POJ.2878 has already been suggested in reports from this Station. We have also suggested, on morphological and cytological evidence, that one of our seedlings from POJ.2878, namely B.37172, is likely to be a self rather than from the originally recorded parentage.

II. Laboratory Work:

Cytological studies were again concerned mainly with the determination of chromosome numbers in sectioned root-tips. Pre-treatment with saturated aqueous a-bromonaphthaline is now the standard technique in this laboratory. Staining is by the crystal violet method, but a useful modification has been worked out to increase sharpness of staining and to delay the fading of preparations. This technique consists of an immersion of stained slides in saturated aqueous picric acid for one minute before proceeding to the iodine-potassium iodide stage of the schedule.

Material of the type-clone of *S. robustum*, 28 NG.251, and of E.K.28, a Javan variety often referred to as "noble", but reputed to be a seedling of POJ.100, which is from the 99-chromosome Loethers, was critically re-examined. Contrary to previously-published data, it was possible to count exactly 80 chromosomes in metaphase plates of both varieties. This agrees with the findings of Price at the U.S. Department of Agriculture in Washington.

The new *spontaneum* clone S.E.S. 205A, which is referred to in the introductory section of this report, was found to have 64 chromosomes. This places it in the same cytological group as the Local Coimbatore *spontaneum*, though it is very different from it in growth characteristics. Hybrids from a cross between this S.E.S. 205A and the noble female Ba.11569 were cytologically examined in the seedling stage, and several of them were found to have 112 chromosomes. This number is interpreted as the $2n + n$ combination, which is to be expected in the first nobilisation of *spontaneums*. One seedling of the population had about 76 chromosomes, and was interpreted at the time as either one of the rare $n + n$ individuals, or the result of selfing or contamination of the female flower. Examination of the seedling later, after considerable growth had taken place and cane formation had begun, left little doubt that it was an example of the rarely-occurring selfs of Ba.11569. It is referred to in the previous section of this report.

A first nobilisation of the 80-chromosome, *robustum* 51 NG. 63, B.6201, was shown to have 80-chromosomes, the $n + n$ combination that is to be expected in such crosses.

Most of the cytological work was concerned with varieties in the inbred lines. More than ninety chromosome determinations have been made in all, several of which

are for derivatives in the fourth and fifth selfed generations. Data obtained during the year served to confirm the previous findings on the cytology of selfs. In general, chromosome numbers tend to stabilise after a few generations of selfing at a figure rather lower than that of the foundation parent.

Counts made for the occasional broad-leafed and thick-stemmed individuals in the J lines from B.4362 have been appreciably higher than for the *spontanenum*-like ones counted previously. It will be recalled that in the latter very considerable losses of chromosomes are deduced to have taken place.

III. Solution Crossing:

Further factors being considered in the routine breeding method being developed are:—

- (i) The careful avoidance of canes damaged by moth borer. Possibly because of the changing composition of the juice, borers appear to feed intensively at the nodes of the cane, and breakage at these points when handling the canes has caused numerous losses. In many varieties as plant canes at Groves, however, few stalks escape attack: ratoons, which will be available in the 1961 season, will probably be better in this respect.
- (ii) The expeditious setting-up of crosses shortly after cutting the arrowing stalks from the field. Using eosin, it was detected that the rate of flow through the xylem of defoliated canes was of the order of one internode in 10 minutes. Since the transportation of arrows from Groves to Codrington involves delays of up to two hours, it is clear that air in the vascular system could account for the pre-mature desiccation of many stalks in solution crossing. Although in Hawaii apparently no measures are taken to allow for transpiration during a longer journey, we shall take measures to place the canes in solution within minutes of being cut, in a container on the lorry.

The bulk of the programme was carried out using 80 ppm SO_2 : 50 ppm H_3PO_4 , with changes three times a week. This was undoubtedly too weak with the prevailing rates of deterioration of the solution, though in certain instances crosses were very successful, suggesting that the strength of the solution was not the most important factor. An experiment also suggested this conclusion. Four generally difficult varieties, and six strengths of solution (with three changes per week) were used, with two stalks per variety per treatment, one of which was painted with Geon latex. Results are given in Table X.

TABLE X

APPROXIMATE NUMBER OF SEEDLINGS GERMINATED PER ARROW FROM SOLUTIONS OF DIFFERENT STRENGTHS

ppm SO_2	WITH LATEX	WITHOUT LATEX
20	0	15
40	23	0
60	20	0
80	43	40
100	30	25
120	100	90

Statistical comparison was not possible because of the high mortality of stalks in all treatments from various combined causes. Varieties differ in arrow size but germination figures were not related to this variable. The effects of concentration and latex look suggestive.

IV. Bunch Competition Among Known Clones:

Seven experiments were planted at nursery spacing (5 ft. x 19 in.) in May 1960, and recorded in January 1961. All clonal material was prepared as single eyes, pre-germinated and potted to simulate the treatment of seedlings.

Experiments 1 and 2 were designed as 4 x 4 lattices (5 replications), but owing to incomplete survival could not be analysed as such.

The 16 treatments were as follows:—

<i>Planting material:</i>	...	...	whole node <i>vs</i> bud chip
<i>Varieties — Expt. 1:</i>	...	B.44237, B.39246, B.39274, j2 and CP.28/11	
— <i>Expt. 2:</i>	...	B.44237, B.41211, B.5121, B.52107 and CP.44/101	
<i>Singles:</i>	...	1 plot of each variety x planting material combination.	
<i>Bunches</i>	...	3 plots, each bunch checked to contain one shoot of each competitor at planting-out time.	

The results are shown in Tables XI and XII.

TABLE XI

SYNTHETIC BUNCHES

RESULTS FROM EXPERIMENTS 1 AND 2. TOTAL INCHES OF CANE PER EYE PLANTED PRODUCED BY B.44237 ARE QUOTED: OTHER VARIETY PERFORMANCES ARE EXPRESSED AS PERCENTAGES OF THIS VARIETY. THESE FIGURES INCORPORATE ANY DIFFERENCES IN SURVIVAL OF COMPETITORS IN BUNCHES: WHERE A VARIETY HAS DIED FROM COMPETITION OR OTHER CAUSES, ITS MEASUREMENT (ZERO) HAS CONTRIBUTED TO THE MEANS SHOWN

EXPERIMENT	VARIETY	SINGLES			BUNCHES		
		Node	Chip	Mean	Node	Chip	Mean
1	B.44237	784	490	637	384	159	272
	B.39246	57	48	53	38	47	43
	B.39274	33	25	29	17	27	22
	j2	45	48	47	33	25	29
	CP.28/11	51	38	45	31	53	42
2	B.44237	503	250	377	194	102	148
	B.41211	42	59	51	38	34	36
	B.5121	63	69	66	44	66	55
	B.52107	60	38	49	30	47	39
	CP.44/101	50	92	71	54	75	65
Mean production (ins.)		383	216		136	73	

TABLE XII
EXPERIMENTS 1 AND 2: RATIO OF PRODUCTION PER EYE ACTUALLY GROWING
IN SINGLES/BUNCHES

EXPERIMENT	VARIETY	NODES	CHIPS
1 ...	B.44237	2.04	2.58
	B.39246	3.07	2.64
	B.39274	2.86	1.87
	j ²	2.77	3.99
	CP.28/11	2.96	1.49
2 	B.44237	2.60	1.62
	B.41211	2.66	2.85
	B.5121	3.15	1.71
	B.52107	4.32	1.28
	CP.44/101	1.22	2.56
Mean 		2.77	2.26

Unfortunately no standard errors can be attached to these comparisons, but it does seem that there is a marked reduction in production per eye planted when bunches are used, though overall a higher yield per stool at 8 months of age. Stools from nodes have produced some $1\frac{1}{2}$ — 2 times as much cane as those from chips at this age, this being due solely to reduced cane number and not cane length, but the ratio of production from singles to that from bunches is about the same in both nodes and chips. B.44237 was the strongest producer in both singles and bunches, and all other varieties used were inferior as singles, and more markedly so in bunches: bunch planting accentuates the variety differences in total length of cane.

Experiments 3, 4 and 5 were of common design, comparing pairs of varieties, planted singly, in pure bunches of 5, and as bunches of mixed proportions totalling 5. Half nodes were used, and 5 stools of each treatment were randomised at nursery spacing. Results are shown in Table XIII.

TABLE XIII

EXPERIMENTS 3, 4 AND 5: PRODUCTION IN INCHES OF CANE.
THE VIGOUR RATING REFERS TO EARLY GROWTH

EXPERIMENT	PRODUCTION PER EYE PLANTED			Mean Production per stool
	More Vigourous Variety	Treatment or ratio	Less Vigourous Variety	
3	j2		B.41227	
	253	singles	202	228
	66	fives pure	52	294
	84	1:4	55	305
	124	2:3	55	412
	95	3:2	36	355
	104	4:1	33	448
4	j2		B.41211	
	241	singles	234	238
	72	fives pure	62	335
	27	1:4	65	285
	38	2:3	80	315
	63	3:2	35	259
	88	4:1	91	441
5	B.49119		B.52214	
	454	singles	288	371
	129	fives pure	62	479
	150	1:4	82	476
	160	2:3	63	509
	117	3:2	44	437
	83	4:1	104	436

The varieties in Experiment 4 were closely similar in production, as the figures for singles and bunches of five indicate. In mixed bunches the stronger variety produced cane in proportion to planting frequency, but not at the expense of the weaker variety: the highest producer was a mixed stool. In Experiment 3 the three varieties were less alike in vigour, so that j2 increases production steeply with more frequent planting, whereas B.41227 gives only a small increase; similarly j2 takes advantage of B.41227 in mixed bunches. The combination giving highest production was one containing 4 times as much j2 as B.41227, and bunches of j2 alone produced less than this combination (328 in.). In Experiment 5 the varieties are very dissimilar — probably to an extent greater than would be found in a seedling family. B.49119, very vigourous as a single, is severely suppressed when planted as a bunch of 5, but so also is the weaker variety B.52214. However, the best combination appears to be — 2 B.49119: 3 B.52214 — a surprising result if their independent performances are considered.

The significance of the results noted in these three experiments could not be estimated adequately because of poor-field survival, but the differences are sufficient to suggest that further observations could give a lead on possible selective processes active in bunches, on the nature of competition between adjacent stools at close spacing, and on the interesting possibilities of variety mixtures utilising soil and air space more efficiently than pure stands and hence giving increased yields.

In **Experiment 6** selfed seedlings of *Eros* were compared with plants from single eye nodes of the parent clone. Ten single stools of each treatment were grown in a randomised block design. The differences between treatment means were highly significant ($P=0.001$) (Table XIV).

TABLE XIV
EXPERIMENT 6 — MEAN INCHES OF CANE PRODUCED

TREATMENT					PRODUCTION	
					Per Eye Planted	Per Stool Grown
<i>Eros clone</i>	singles	...	...	...	134.5	134.5
	fives	...	...	...	40.9	204.3
<i>Eros selfed</i>	singles	...	...	...	154.2	154.2
	fives	...	...	...	66.1	330.7
L.S.D. ($P = 0.01$)					—	109.4

Seedlings and clone were equally productive, on average, as singles, but in bunches seedlings appeared more vigorous than the clone.

Experiment 7 compared two parents — one-eye nodes planted as singles, pure bunches of four and mixed fours — with their seedling progeny, planted as singles and fours. The results are given in Table XV.

TABLE XV
EXPERIMENT 7 — INCHES OF CANE PRODUCED: MEANS OF 8 REPLICATES

MATERIAL				TREATMENT	PRODUCTION	
					Per Eye Planted	Per Stool Grown
B.35247	...	...	...	singles	125	125
				fours	100	399
B.45151	...	...	...	singles	163	163
				fours	100	401
B.35247	...	...	...	half bunch	95	} 437
B.45151	...	...	...	half bunch	124	
Seedling progeny		...	...	singles	516	516
				fours	206	822
L.S.D. (P = 0.01)					134	238

The only significant differences in this experiment were the superiority of the seedlings over the parents, and of fives over singles. The order of merit was unchanged in bunch planting in this case. The superiority of seedlings may be due to genuine heterosis, or possibly to some inhibition in tillering in the plants grown from cuttings. Experiments 1 and 2 show that the form of cutting used

can influence the tillering: it is possible to conclude from these experiments that chip plants, carrying the minimum of food storage tissue, nevertheless do not imitate seedlings more closely than complete nodes as was expected from their early growth in pots. This point will be checked in an experiment in which cuttings from seedlings in the B.63' series can be compared with seedlings of the same crosses repeated in the B.64' series.

V. Selection from Singles and Bunches:

In the B.61' series 26 families had been recorded carefully for survival and selection rate in the nursery in October 1959 (see last year's Annual Report). The first year trial performances of the selected varieties were recorded in February 1961, and by examining ten-stool plots of these selections from the first year trial they were further reduced before planting second year trials in October 1961.

Correlation in selection rates considering singles and bunches as two samples of the population.

Selection rates were very similar in singles and bunches in the nursery stage (Figure 1a). Only five families fall outside the fiducial limits ($p = 0.01$) of the regression line $b = 0.926$, which does not differ significantly from $b = 1.0$. There was a less clear relationship between selection rates from the first year trial (Stage 2; Figure 1b), suggesting variable efficiency in the nursery selection. Similarly the overall selection rates, i.e. the percentage of the original seedlings selected through three stages for second year trial, were not closely correlated (Figure 1c). All selection rates were calculated on the basis of seedlings surviving at the time of selection in the nursery. In bunches this figure is the recognisable number of seedlings, five having been potted but on average only one or two being recognisable. If survival is ignored, $b < 1.0$ and is less consistent (Figure 1d).

From a multiple regression analysis it was shown that overall selection rates were determined principally by the selection from the first year trial. Ten-stool plots were also significant in their contribution to overall selection but the contribution of nursery selection was relatively inconsistent from family to family, particularly in the case of bunches. The number of seedlings per bunch was not a significant component.

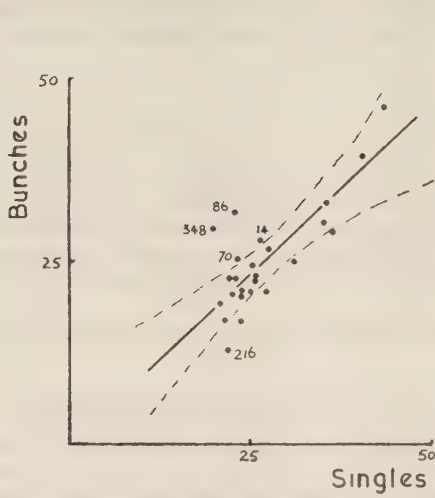
Advancement achieved by rigorous selection in Stage 1.

The selection rate in the second stage is determined more by the level of efficiency of the first selection than by family characteristics, except inasmuch as different family characters are used as selection criteria. This is likely to happen where some simple overriding criteria such as disease resistance is applied, but this was not the case in this series. It is also likely to occur where spacing and age of cane are different from stage to stage, though in the present case the *percent field selection* from the first year trial is based on growth characters similar to those used in the nursery, allowing for the fact that the cane is 16 and 6 months old respectively.

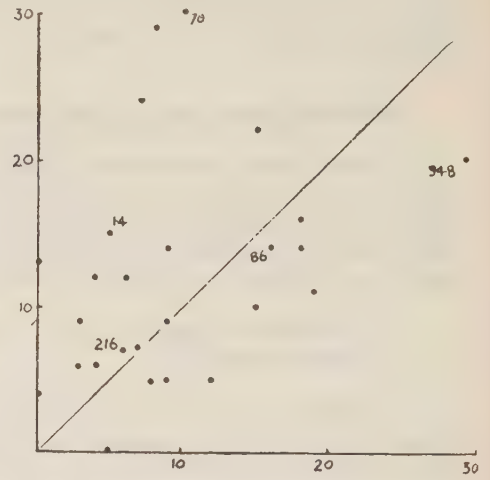
The first year trial provided three measures of advance (over random sampling) attained by the nursery selection. A high score for mean weight (heavy) and a low score for variance in weight (uniform) signifies a good first year trial performance as a result of efficient nursery selection. The field selection rate approximately measures these, though additional characters may take precedence over weight as selection criteria in some families.

Figure 1

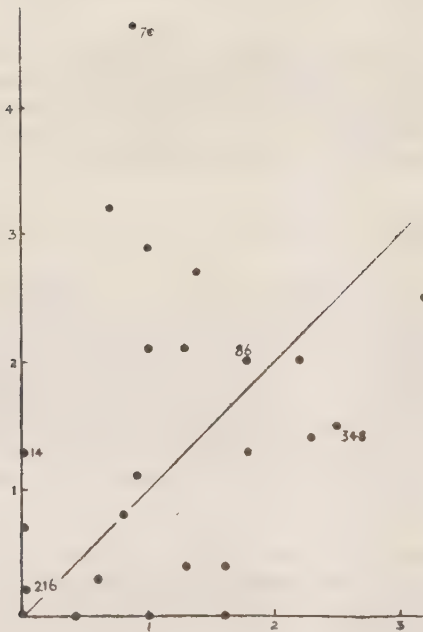
Selection rates in bunches plotted against singles for 26 families in the B.62¹ series.



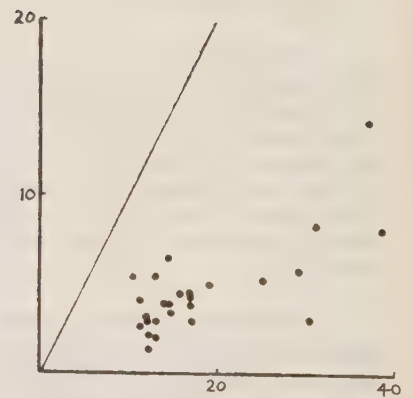
(1a) Nursery selection (percentages transformed to angles).



(1b) First Year Trial per cent field selection.



(1c) Overall selection rate — per cent selected for Second Year Trial.



(1d) Nursery selection ignoring survival rates of singles and bunches.

If selection for weight has been on an absolute rather than relative scale, and completely efficient, family differences should be negligible in the next stage.

Figure 2 shows that both the variability between family means, and the within-family variances, were still of considerable magnitude in Stage 2. Moreover, selections from bunches were about twice as variable in performance than the selections from singles. (Table XVI.)

TABLE XVI

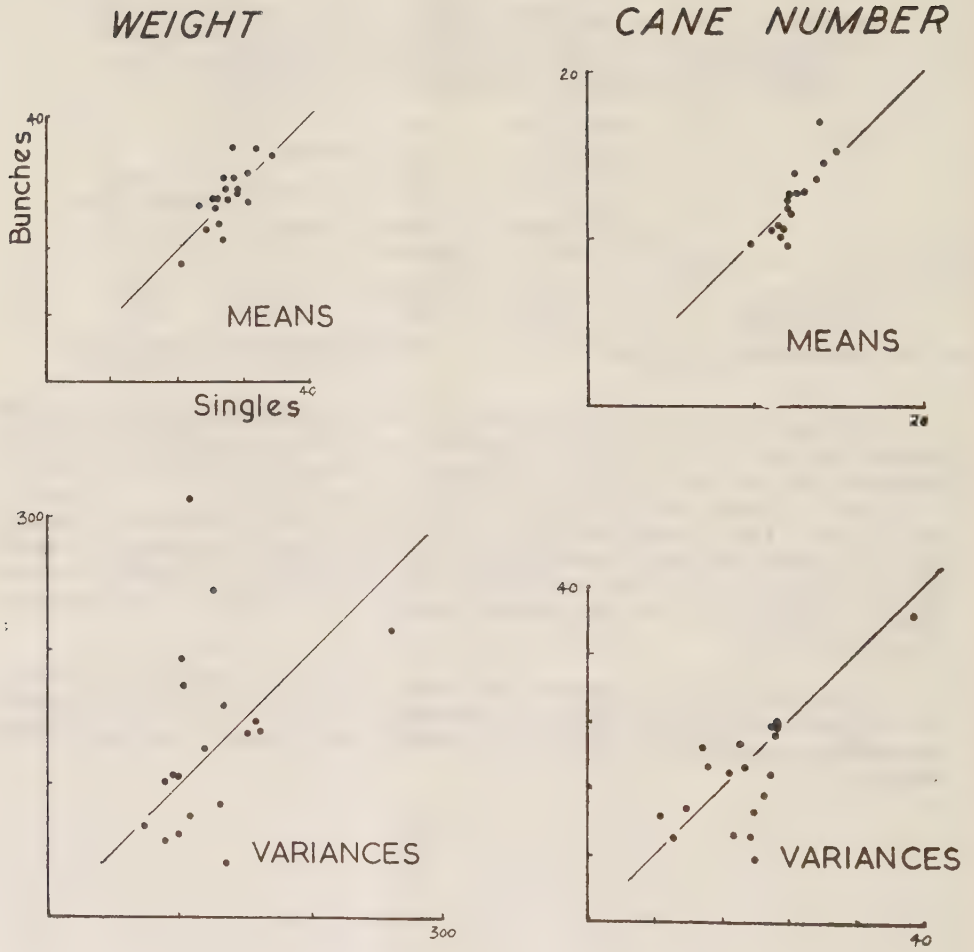
MEANS OF, AND VARIANCES BETWEEN, 19 FAMILIES IN THE FIRST YEAR TRIAL (STAGE 2) FEBRUARY, 1961. MORE EFFICIENT SELECTION IN STAGE 1 WOULD HAVE REDUCED THE GENETIC VARIATION TO A MORE UNIFORM, LOWER LEVEL

	WEIGHT		CANE NUMBER		Nursery Selection Rate
	Mean	Variance	Mean	Variance	
SINGLES BUNCHES	27.4	10.1	12.3	1.8	20.3%
	28.1	20.1	12.3	3.8	18.6%

The variation between bunch selections was often markedly greater or smaller than the variation between selections from singles of the same family (Table XVII), though in only two cases were these differences significant, selections from bunches being more variable than those from singles in families 348 ($P = 0.05$) and 14 ($P = 0.01$). This is understandable in family 348, where the nursery selection rates from singles and from bunches were markedly different but presumably should not have been, in spite of low survival of seedlings in bunches: in family 14 it can only be explained by inefficient selection leading to the selection of inferior canes from the bunches.

The observations all suggest that bunch selection is inefficient in detecting the best varieties and as a means of assessing a family. The situation might be improved by using different criteria for selection from bunches from these used in singles.

Figure 2



Means and within family variances of 19 families in the First Year Trial of the B.62' series: selections from bunches plotted against singles.

TABLE XVII

RATIOS (BUNCHES/SINGLES) FROM WITHIN FAMILIES IN THE B.61' SERIES

FAMILY	NURSERY selection rate	FIRST YEAR TRIAL		
		selection rate	mean weight	variance weight
348	2.09	0.69	1.00	1.89
2	1.05	2.00	1.07	1.12
86	1.90	0.88	0.99	0.66
70	1.25	3.00	1.24	0.33
48	1.00	1.00	1.07	0.79
14	1.14	3.00	1.16	2.93
216	0.38	1.17	0.93	1.10
47	0.97	1.56	1.08	0.89
11	0.54	singles zero	0.91	0.63
76	0.79	1.47	1.00	0.82
24	0.75	0.67	1.01	0.88
13	0.79	singles and bunches zero	0.88	0.88
325	0.81	0.78	1.11	1.85
352	0.65	0.63	1.04	0.66
395	0.98	0.89	0.90	1.61
43	0.69	3.43	1.13	1.18
6	0.78	1.00	1.02	1.07
106	0.70	0.58	1.10	1.05
85	0.99	0.56	0.81	0.87

VI. Parents and Progeny at two levels of Fertilisation:

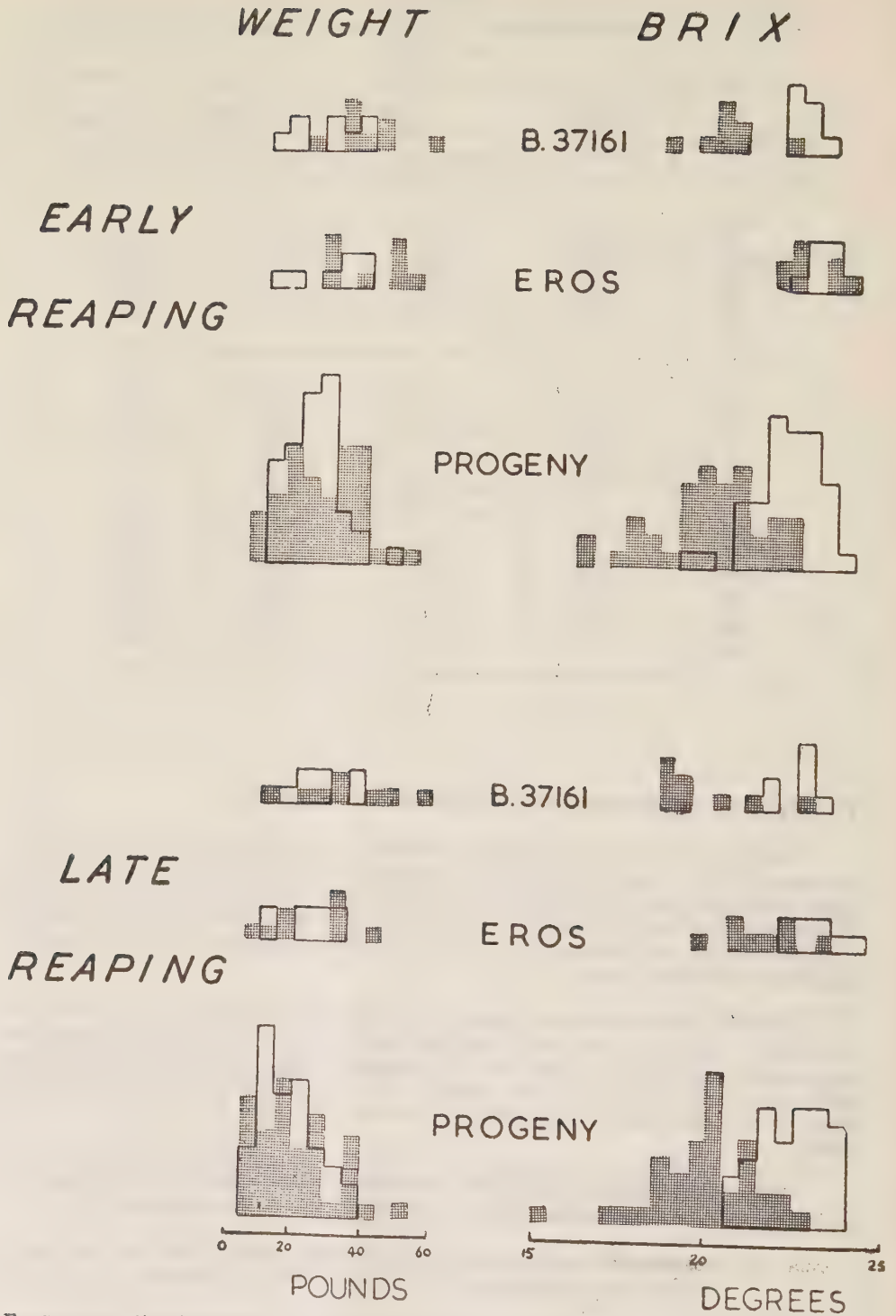
B.37161, Eros and 40 seedlings of their F_1 were planted in an experiment in January 1960. Single eye cuttings were used, each parent being represented by eight stools and each seedling by two stools, randomised in each of four blocks. The progeny were in fact a random selection from the original nursery seedlings, with the proviso that in obtaining the first 40, five failed to germinate or had too little planting material to be used.

Two of the blocks were mulched with pen manure, and irrigated with overhead spraylines at frequent intervals from planting time until too thick to penetrate, and several applications of sulphate of ammonia, adding up to about 10 cwt. per acre, were made. The other two blocks were unfertilised and unirrigated. One block of each treatment was reaped in February 1961, and the other pair in April 1961.

Being a single-stool experiment, duplicate errors were large, but visual examination of the distribution patterns (Figure 3) shows the following:—

- (i) The parents were similar in mean weight, except that Eros tended to become pithy and weighed less in April than in February.

Figure 3



Frequency distributions in parents (B.37161 and Eros) and their F_1 progeny under two conditions of growth and reaped at two dates.

Outlined histograms: low fertiliser

Shaded histograms: high fertiliser

- (ii) The parents showed greater variability for weight at high fertiliser level, but the progeny means were even more markedly more variable at the high fertiliser level. Selection among the progeny under conditions of good growth would therefore be more efficient, though this gain would be offset partly by the increased environmental variation indicated by the parent clones. Much of this variability might be traceable to uneven rates of establishment, with corresponding increased competition between stools.
- (iii) In brix, the progeny mean was lower than both parents. B.37161 ripened between the two reaping dates, whereas Eros was similar on both dates. (In the progeny ripening patterns were not obvious in many of the varieties).
- (iv) The variability of brix in both parents and progeny was greater at the early reaping date.
- (v) At the high fertiliser level variability between stools of the parents was greater than at the low fertiliser level. This effect was more marked than any due to reaping date.
- (vi) Similarly, the variability between progeny was severely limited at the low fertiliser level, particularly at the later reaping date, giving a skewed distribution. Differences between progeny means were greatest at high fertiliser level in February, and their distribution most nearly normal. Selection would have been most efficient under these latter conditions.

The correlations between brix and weight were with one exception not significant (Table XVIII). In particular there was no marked tendency for negative genetic correlation between these characters, measured by the progeny means, in any of the treatments.

TABLE XVIII

CORRELATION COEFFICIENTS BETWEEN BRIX AND WEIGHT

			HIGH FERTILISER			LOW FERTILISER		
			B.37161	Eros	Progeny	B.37161	Eros	Progeny
FEBRUARY	...	...	-0.20	-0.48	0.33	0.76	0.33	0.09
APRIL	...	...	0.52	0.54	0.11	0.23	-0.29	-0.31

VII. Hot Water Treatment:

In the first ratoons of six latin square experiments comparing stocks of commercial varieties, no differences were detected. The lack of differences may be because the original change with heat treatment has become attenuated in the stocks planted, and possibly because some of the trial sites were in areas with very low arrowing intensity for the last two years. The trials have been abandoned.

New stocks have been treated to see if the increase in arrowing produced in the earlier series can be reproduced. Repeated annual treatment is being given to other stocks in an attempt to detect and possibly accumulate larger changes.

VIII. Variety Comparisons from Factory Data:

For the first time*, we believe, a local factory undertook a programme of sampling first mill juice from a large number of identified loads, and the contributing plantations supplied the tonnages of cane reaped in the corresponding fields. From the fibre contents of the four major varieties from our own milling tests in 1961, the weekly factory control data, and the above records, pounds sugar per ton of cane, and tons sugar per acre were calculated and plantations and varieties were compared.

Although the plantations adjoined one another in quite a compact area, quite wide differences between them were apparent, due to management and/or environmental differences. Variety differences were broadly in keeping with the results of the Station's variety trials, notably B. 41211, in spite of lower fibre content, contains less sugar per ton of cane than the other varieties. The figures are shown in Table XIX. The figures are higher than actual manufactured sugar, because the tests were made on relatively fresh cane, the Winter-Carp correction was too high a factor for application in this factory, and much of the cane outside the survey comprised emergency deliveries of burnt cane, but between 60% and 90% of the weekly delivery consisted of identified loads of one of the four varieties.

The week-by-week differences showed no obvious differences in ripening patterns; probably differences between fields are greater than differences between varieties. The different times of reaping one variety on different plantations, and differences between plant canes and ratoons, make detailed interpretation of these ripening curves impossible. The conclusions refer strictly to the varieties as managed and reaped by this group of plantations, and do not necessarily hold true for different management routines or different reaping dates.

*Barbados has relied on a combination of good environment for ripening, and satisfactory performance of new varieties in quality tests made by this Station before release for commercial cultivation, to ensure satisfactory factory performance, in the belief that other differences, as found here, are of minor importance and could not warrant the cost of sampling and testing each load.

TABLE XIX

LB. AVAILABLE POL. PER TON OF CANE
(Number of fields sampled shown in parentheses)

PLANTATION	B.41211	B.45151	B.4744	B.49119	Mean
1	230.5 (1)	300.0 (6)	288.5 (8)	274.9 (10)	273.5 (25)
2	280.1 (7)	302.8 (5)	291.4 (17)	277.3 (13)	287.9 (42)
3	272.7 (5)	289.2 (7)	284.7 (14)	277.5 (14)	281.0 (40)
4	260.0 (7)	280.2 (9)	279.0 (10)	276.5 (8)	273.9 (34)
5	260.5 (2)	298.5 (9)	269.2 (8)	281.1 (8)	277.3 (27)
6	261.3 (7)	287.2 (7)	286.2 (8)	280.3 (13)	278.8 (35)
7	269.3 (4)	277.9 (4)	291.1 (8)	271.2 (5)	277.3 (21)
8	257.4 (2)	288.8 (19)	283.2 (19)	280.6 (2)	277.5 (42)
Weighted Means ...	266.1 (35)	290.2 (66)	284.7 (92)	277.5 (73)	

TABLE XX

TONS SUGAR PER ACRE — AVERAGES OF ALL SAMPLED
FIELDS IN WHICH TONNAGE HAD BEEN RECORDED FOR AN IDENTIFIED
VARIETY

PLANTATION	B.41211	B.45151	B.4744	B.49119	Mean
1	3.88 (1)	3.96 (6)	3.92 (8)	3.90 (10)	3.92 (25)
2	3.64 (7)	4.29 (5)	4.23 (16)	3.93 (11)	4.02 (39)
3	3.68 (5)	3.96 (7)	3.99 (14)	3.58 (14)	3.80 (40)
4	3.90 (7)	3.93 (9)	4.40 (10)	3.94 (8)	4.04 (34)
5	3.93 (2)	3.62 (9)	3.95 (8)	4.29 (8)	3.95 (27)
6	3.84 (7)	3.38 (7)	4.13 (8)	3.86 (13)	3.80 (35)
7	5.02 (2)	4.23 (1)	5.26 (5)	4.27 (2)	4.70 (10)
8	3.71 (2)	4.88 (18)	4.83 (18)	3.69 (2)	4.28 (40)
Weighted Mean ...	3.86 (33)	4.14 (62)	4.33 (87)	3.89 (68)	

Varietal Trends in Contributing Territories

Jamaica:

B.41227, after showing increases over several years, is now on the decrease, mainly accounted for by increased plantings of B.4362. There are major differences in variety distribution, according to the climatic zones of the island: B.37172 is practically confined to the wet eastern estates and B.42231 to the irrigated estates. Of the two major varieties, B.41227 is less popular on the wet eastern estates and on the dry north coast than elsewhere, while B.4362 is the newest approach to a general purpose variety in Jamaica.

Variety per cent acreage figures for 1960 and 1961 are shown below:—
Percentages refer to acres reaped.

			1960	1961
B.41227	...	...	39	35
B.4362	...	...	32	34
B.42231	...	...	11	11
B.37172	...	...	3	4
B.3439	...	...	2	2
Co.331	...	...	3	2
B.34104	...	...	2	1

British Guiana:

B.41227 continues to increase in popularity, and all the other major varieties have shown slight decreases, as the following comparative table shows:—

			1960	1961
B.41227	...	...	41.9	45.3
B.37161	...	...	36.3	35.1
B.47258	...	...	7.6	6.9
B.47225	...	...	3.9	3.5
Pindar	...	...	2.0	1.6
B.4362	...	...	2.0	1.4

Trinidad:

Here again, B.41227 continues to increase in acreage at the expense of the older commercial varieties B.3337, B.37161 and B.37172. There was increased interest in B.45224, a variety not grown elsewhere in the Caribbean, and in B.49119. Percentages for the crops of 1960 and 1961 were:—

			1960	1961
B.41227	...	...	37.2	43.6
B.37172	...	...	17.8	15.5
B.3337	...	...	17.2	10.6
B.37161	...	...	14.4	9.3
B.45224	...	...	2.5	5.7
B.49119	...	...	1.0	2.6

Plant cane acreages show that the trend towards the newer varieties is continuing in Trinidad: they are as follows:—

B.41227	...	...	...	46.4%
B.37172	...	...	...	12.4
B.49119	...	...	...	9.2
B.45224	...	...	...	7.6
B.37161	...	...	...	3.1
B.3337	...	...	...	1.4

Barbados:

There are moderate increases in the three major varieties B.4744, B.49119 and B.45151 for the 1962 crop and an appreciable decrease in B.41211. Acreages under other varieties are almost negligible:—

			1961	1962
B.4744	...	...	26.8	28.0
B.49119	...	...	20.7	25.8
B.45151	...	...	20.3	22.1
B.41211	...	...	23.0	17.3
B.37161	...	...	3.3	1.8
B.4098	...	...	1.3	0.8

Antigua:

B.49119 now accounts for more than half the cane acreage reaped. The old favourite B.4098, which occupied more than 95% of the area as recently as 1955, has been reduced to less than 22% in 1961. No other variety was of significance.

Variety per cent acreage figures for 1959 and 1961, to indicate the extraordinary swing to B.49119, were as follows:—

			1959	1961
B.49119	...	...	16.6	55.2
4098	...	...	73.5	21.8
B.4744	...	...	4.4	6.1

The fact that B.49119 represents 66.6% of the plant cane acreage in 1961 shows that the trend continues.

St. Kitts:

The two major varieties, B.37161 and B.41211 show some reduction in acreage. Increases were for the newer varieties B.45151, B.47419 and B.49119. St. Kitts is the only territory growing B.47419 on a large scale. The figures were as follows:—

			1960	1961
B.41211	...	...	51.4	49.8
B.37161	...	...	18.2	13.0
B.45151	...	...	8.7	10.6
B.47419	...	...	5.4	8.2
B.49119	...	...	4.3	7.4

St. Lucia:

The only significant change is a moderate increase in the percentage of B.37172. Owing to the long ratooning practised in St. Lucia, variety changes tend to be slower there than in other territories of the British West Indies. The figures for 1960 and 1961 were:—

			1960	1961
B.37172	...	...	61.4	65.3
B.37161	...	...	24.8	21.9
B.4362	...	...	4.1	4.1
B.41227	...	...	4.6	7.3
B.4098	...	...	—	1.4

Varieties in B.W.I.S.A. Territories:

Data for varieties reaped in Barbados, British Guiana, Trinidad, Jamaica, Antigua, St. Kitts and St. Lucia for the crop seasons 1943 to 1960 have been analysed, and the overall results have been incorporated in a chart.

The total acreage reaped for the 1960 crop was 288,020, and the positions of the leading varieties were as follows:—

Variety	Acreage	Percentage
B.41227	85,302	29.8
B.37161	47,878	16.7
B.4362	24,147	8.4
B.41211	18,960	6.6
B.4744	12,119	4.3
B.37172	11,787	4.1
B.49119	11,101	3.9
B.45151	9,489	3.3

This table shows clearly the popularity of B.41227, which is the leading commercial variety of Jamaica, Trinidad and British Guiana. The area under the second variety B.37161, is on the decline in all countries of the B.W.I.S.A. area where it is grown, but it still occupies a very large acreage. In the non-contributing territories of the Caribbean it is still popular also. Figures kindly supplied by the Experimental Station of the University of Puerto Rico at Rio Piedras show that there were 56,635 acres of B.37161 in Puerto Rico for the 1959 crop. The newer varieties were less well represented, but there were 1,263 acres of B.41227 and 1,871 acres of B.4362.

We have no precise information on acreages of Barbados varieties in Cuba, but it is known that they are grown extensively there. It is reported that there were several thousand acres of B.4362 in 1960 in one mill area alone.

Distribution of Varieties to Contributing and other Countries

Jamaica: ... NCo. 310, NCo. 330, Co. 603, Co. 622, H.44-3098, CP.44-155,
B.50112 B.58141, B.58165.

Single cuttings of 344 varieties of the B.60' series.

British Guiana: ... B.51410, B.51414, B.51415, B.51418, B.52405, B.5686, B.5660,
B.56102.

Single cuttings of 344 varieties of the B.60' series.

**Trinidad, Antigua
and St. Kitts:** ... B.5801, B.5802, B.5809, B.5863, B.5874, B.5891, B.58109,
B.58112, B.58114, B.58137, B.58141, B.58143, B.58150, B.58165,
B.58166, B.58169, B.58176, B.58230.

Martinique: ... B.5801, B.5802, B.5809, B.5863, B.5874, B.5891, B.58109,
B.58112, B.58114, B.58137, B.58141, B.58143, B.58150, B.58165,
B.58166, B.58169, B.58176, B.58230.

Guadeloupe: ... 28NG.13, B.5121, B.51410, B.51414, B.51415, B.5787, B.5789,
B.5791, B.57133, B.57146, B.57156, B.5801, B.5802, B.5809,
B.5863, B.5874, B.5891, B.58109, B.58112, B.58114, B.58137,
B.58141, B.58143, B.58150, B.58165, B.58166, B.58169, B.58176,
B.58230.

Single cuttings of 100 varieties of the B.60' series.

St. Vincent: ... B.37172, B.4362, B.46364, B.52107, B.5401, B.5480, B.54142,
B.54277.

Montserrat: ... B.41211.

British Honduras: B.3439, B.4362, B.45151, B.45152, B.42231, B.52107, B.5401
B.5480, B.54142, B.54277.

**La Romana (Domini-
can Republic):** B.45137, B.50112, B.5213, B.53164, B.5401, B.54262, B.54277,
B.5789, B.5791, S.E.S.205A, B.51410.

Surinam : B.41227, B.47258, B.49119, B.50135, B.52107, B.5480, B.54142,
B.54277, B.55227, B.55228.

Costa Rica: B.4738, B.47258, B.47314, B.47419, B.50135, B.50377, B.52107,,
B.52389, B.5401, B.5480, B.54142, B.54277.

Panama: B.51410, B.51414, B.51415, B.51418, B.52405.

St. Croix: ... B.51410, B.51414, B.51415, B.51418, B.52405.

Mauritius: B.49119, B.52107, B.52298, B.47258, B.47225, B.39246, B.45151.
B.41211, B.5336, B.5650.

Kenya: B.52298, H.32-1063.

Senegal: B.37161, B.37172, B.41227, B.4362.

U.S.A: B.45137, B.53164, B.54172, B.54142.

APPENDIX I

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING 1960—61 — B. 63' SERIES

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in the Field Nursery

GROUP	CROSS		No. Ger- minated	NO. PLANTED IN FIELD NURSERY	
				Singles	Bunches
<i>S. officinarum</i> x <i>S. spontaneum</i>					
4th Glagah Nobilisation ...	B. 3439	x B 39220	41	39	—
1st SES. 205A Nobilisation ...	Ba. 11569	x SES. 205A	75	75	—
Noble x Glagah x Local ...	B. 3439	x Pindar	130	126	—
	B. 55258	x B. 5126	1,600	988	25
	B. 5650	x d. 231	8	8	—
Noble x Glagah x Celebes ...	B. 3439	x B. 43337	365	359	—
	B. 42304	x B. 46364	700	455	2
	B. 46364	x Self	11	10	—
Noble x Glagah x Local x Celebes	B. 55258	x B. 43337	42	38	—
			2,972	2,098	27
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> ...					
Noble x Glagah x Barberi ...	B. 52107	x Self	1,000	292	16
	H. 32—8560	x a. 131	13	13	—
	H. 32—8560	x B. 41227	176	176	—
	H. 32—8560	x B. 4327	557	549	—
	H. 32—8560	x B. 47233	352	330	—
	POJ. 213	x B. 3337	1,200	530	31
Noble x Local Glagah x Barberi	B. 3172	x B. 34104	209	197	—
	B. 3172	x B. 47314	18	18	—
	B. 3172	x 5. 49119	99	91	—
	B. 3365	x B. 42231	337	306	—
	B. 3365	x B. 4738	44	36	—
	B. 3365	x B. 4744	113	105	—
	B. 3365	x B. 54163	19	18	—
	B. 3365	x NCo. 310	136	132	—
	B. 3439	x B. 45237	600	302	14
	B. 3439	x B. 49257	28	28	—
	B. 3439	x B. 5480	47	47	—
	B. 3439	x c. 4144	10	10	—
	B. 37161	x B. 49119	800	490	10
	B. 37161	x c. 4125	48	48	—
	B. 37161	x p. 12	100	91	—
	B. 37161	x t. 15	375	350	—
	B. 37172	x B. 5411	27	25	—
	B. 4096	x B. 49119	1,100	297	25
	B. 4145	x B. 4744	78	76	—
	B. 42231	x B. 49119	1,200	640	21
	B. 42304	x B. 4995	442	420	—
	B. 42304	x B. 49119	650	423	9
	B. 4362	x B. 41211	93	92	—
	B. 43253	x B. 49119	416	410	—
	B. 45121	x B. 4098	646	636	—
	B. 45137	x B. 52107	280	272	—
	B. 45137	x NCo 330	8	—	1
	B. 45137	x Co 270	80	80	—

APPENDIX I — (Continued)

GROUP	CROSS		No. Ger- minated	No. PLANTED IN FIELD NURSERY	
				Singles	Bunches
Noble x Local x Glagah x Barberi	B. 4733	x B. 55258	27	24	—
	B. 4744	x B. 49119	1,728	680	28
	B. 48209	x B. 4098	53	49	—
	B. 48330	x Co. 331	600	392	9
	B. 4906	x B. 4362	75	71	—
	B. 4906	x B. 49119	1,327	834	33
	B. 4906	x B. 53200	450	396	—
	B. 4906	x B. 5480	900	596	16
	B. 4906	x B. 54163	8	8	—
	B. 4906	x CP 44—155	122	119	—
	B. 4906	x w. 1	787	755	—
	B. 49257	x B. 49119	138	138	—
	B. 49257	x Self	33	32	—
	B. 5011	x NCo 310	35	35	—
	B. 5055	x B. 4747	117	116	—
	B-5055	x B. 53200	500	364	7
	B. 50126	x B. 41227	120	115	—
	B. 51116	x B. 51134	201	177	—
	B. 51131	x Pindar	18	18	—
	B. 52184	x B. 34104	114	110	—
	B. 52315	x B. 43214	160	160	—
	B. 52321	x B. 4744	13	11	—
	B. 52389	x B. 41227	582	520	—
	B. 52389	x Eros	104	99	—
	B. 53348	x Cl. 41—223	18	18	—
	B. 5490	x B. 5916	7	7	—
	B. 55250	x NCo-330	342	334	—
	B. 55258	x Eros	54	54	—
	c. 32	x B. 41227	152	148	—
	c. 32	x Co. 991	85	84	—
	Cl. 41—223	x B. 49119	1,000	684	13
	Co. 290	x B. 49119	2,500	604	51
	Co. 360	x B. 4098	289	270	—
	Co. 360	x B. 47314	99	99	—
	Co. 360	x B. 57156	9	9	—
	Co. 421	x B. 54163	650	446	15
	Co. 603	x B. 34104	700	423	13
	Co. 603	x B. 41227	9	8	—
	D. 62+43	x Pindar	10	—	7
	Eros	x B. 49119	299	274	—
	F. 36—819	x B. 3337	500	285	11
	F. 36—819	x B. 34104	30	30	—
	H. 32—8560	x B. 42231	341	330	—
	H. 32—8560	x B. 51134	1,000	525	25
	PR. 1000	x B. 42231	702	687	—
	PR. 1000	x B. 5736	700	384	5
	Trojan	x B. 49119	2,700	961	33
Noble x Glagah x Celebes x Barberi	B. 45119	x B. 46364	800	520	15
	H. 32—8560	x B. 49198	30	28	—
Noble x Local x Celebes x Barberi	B. 3365	x B. 47177	428	419	—
Noble x Local x Glagah x Celebes x Barberi	B. 42304	x B. 50377	1,500	428	35
	B. 45225	x B. 50377	800	454	13
	B. 46364	x B. 49119	785	655	—
	B. 5082	x Pindar	13	13	—

APPENDIX I — (Continued)

GROUP	CROSS		No. Ger- minated	NO. PLANTED IN FIELD NURSERY	
				Singles	Bunches
Noble x Local x Glagah x Celebes x Barberi	B. 50210	x B. 4744	165	158	—
	B. 50210	x B. 47314	704	696	—
	B. 52371	x B. 49119	890	835	—
	B. 53164	x B. 49119	1,400	807	14
	B. 53165	x B. 34104	264	206	—
	B. 53165	x B. 4747	459	412	—
	B. 53165	x B. 49119	488	482	—
	B. 55258	x B. 47177	174	172	—
	B. 55258	x B. 50377	2,000	607	35
	Co. 421	x B. 47151	873	869	—
	PR. 1000	x B. 46364	550	293	7
Noble x Local x Glagah x Dacca x Barberi ...	B. 4581	x B. 34104	16	16	—
Noble x Philippines x Barberi ...	B. 3365	x CP. 36—154	515	506	—
Noble x Local x Glagah x Philip- pines x Barberi ...	B. 5037	x CP. 36—154	52	51	—
			44,615	28,640	512
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>					
Noble x Celebes x Sinense ...	B. 47183	x B. H. 10 (12)	19	19	—
Noble x Glagah x Celebes x Sinense	B. 45154	x B. 43337	205	203	—
			224	222	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S.</i> <i>barberi</i> x <i>S. sinense</i>					
Noble x Local x Barberi x Sinense	B. 37161	x B. 45151	278	248	—
	B. 37161	x B. 47258	442	340	—
	B. 42279	x B. 45151	500	243	20
	n. 2	x B. 47258	11	10	—
Noble x Glagah x Barberi x Sinense	B. 45119	x B. 4864	63	63	—
Noble x Local x Glagah x Celebes x Barberi x Sinense ...	B. 52371	x B. 47258	522	453	—
Noble x Local x Glagah x Barberi x Sinense ...	B. 37161	x B. 54142	673	542	—
	B. 4145	x B. 47258	597	567	—
	B. 4214	x B. 54142	28	28	—
	B. 45119	x B. 49119	392	385	—
	B. 45119	x B. 5480	27	26	—
	B. 45152	x Pindar	8	7	—
	B. 4733	x B. 54142	96	93	—
	B. 47179	x B. 45151	82	82	—
	B. 48330	x H. 32—1063	111	111	—
	B. 4906	x B. 45151	1,200	399	12
	B. 5061	x B. 5745	75	67	—
	B. 52222	x B. 47258	1,200	688	5
	B. 53348	x B. 47258	1,000	345	28
	B. 5401	x B. 5744	42	42	—
	B. 5791	x B. 5745	10	10	—
	Co. 360	x B. 45151	353	352	—

APPENDIX I — (Continued)

GROUP	CROSS	No. Ger- minated	No. PLANTED IN FIELD NURSERY	
			Singles	Bunches
Noble x Local x Glagah x Barberi x Simense	D. 62/43 x B. 45151	719	676	—
	F. 36—819 x B. 47258	122	116	—
	H. 32—8560 x B. 47258	379	354	—
	PR. 1000 x B. 54142	125	125	—
		9,055	6,372	65
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i> Noble x Glagah x Robustum ... Noble x Glagah x Local x Robustum	B. 48361 x g. 3322	34	29	—
	B. 55250 x 32MQ. 579	311	310	—
		345	339	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i> ... Noble x Glagah x Barberi x Robustum	H. 32—8560 x 32MQ. 579	28	28	—
	B. 3439 x CP. 43—64	51	44	—
	B. 49170 x Eros	61	60	—
Noble x Glagah x Local x Barberi x Robustum	B. 42279 x B. 51242	22	22	—
	B. 4455 x NCo. 310	41	41	—
Noble x Local x Glagah x Barberi x Robustum	B. 44233 x B. 49119	1,500	—	135
	B. 49170 x B. 54163	25	17	—
	B. 49388 x B. 42231	264	263	—
		1,992	475	135
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i> x <i>S. robustum</i> Noble x Local x Barberi x Sinense x Robustum	B. 53179 x B. 47258	12	12	—
	B. 44233 x B. 45151	2,500	—	298
	B. 48357 x B. 45151	142	141	—
		2,654	153	298
<i>Open Pollinated</i>				
	B. 46364	1,200	—	60
	b. 431	260	—	13
	B. 47258	120	—	6
	B. 3337	340	—	17
	B. 39254	140	—	7
		2,060	—	103
TOTALS		63,917	38,299	1,140

APPENDIX I — (Concluded)

GROUP	CROSS		No. Ger- minated	NO. PLANTED IN FIELD NURSERY	
				Singles	Bunches
	Selfs and Inbreds for Research Programme				
<i>S. officinarum</i> x <i>S. barberi</i> ...					
3rd Barberi Nobilisation ...	u.15	x Self	1,000	255	28
	u.1422	x Self	67	62	—
			1,067	317	28
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. Barberi</i>					
Noble x Glagah x Barberi ...	a.131	x Self	10	10	—
	j.17	x Self	600	192	14
	j.37	x Self	2,500	312	56
Noble x Local Barberi	r.143	x Self	192	187	—
Noble x Local x Glagah x Barberi	B.54281	x Self	350	205	3
	c.111	x Self	120	101	—
	c.231	x Self	23	23	—
	c.4144	x Self	4	4	—
	w.1	x Self	114	105	—
	x.1	x Self	2,200	197	56
			6,113	1,336	129
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>					
Noble x Glagah x Sinense ...	b.129	x Self	3,000	180	47
	b.22272	x Self	132	124	—
			3,132	304	47
	SUB-TOTALS		10,312	1,957	204
	GRAND TOTALS		74,229	40,256	1,344

APPENDIX II.

SUGAR CANE FIRST YEAR SEEDLING TRIAL — B.62' SERIES

List of Crosses and Number of Seedlings of each Planted in the Field Nursery (May 1960) and in the First Year Seedling Trial (October 1960)

GROUP	CROSS	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
		Singles	Bunches	
<i>S. officinarum</i>				
Noble	Ba. 11569 x Ajax	215	211	280
<i>S. officinarum</i> x <i>S. spontaneum</i>				
2nd Dacca Nobilisation	Otaheite x B.39250	15	—	7
2nd Glagah	Ba. 11569 x B. 44131	43	—	2
	Syn. Kassoer x Comus	81	—	0
	B. 44130 x Comus	110	—	6
	B. 44132 x Comus	105	—	6
3rd Glagah	B. 3439 x Eros	667	—	187
4th Glagah	Eros x Self	400	—	51
	B. 39220 x Self	16	—	0
1st Tukuyu	Tukuyu No. 2 x Comus	3	—	0
		1,440	—	259
<i>S. officinarum</i> x <i>S. sinense</i>				
1st Sinense Nobilisation	Merthi x B. 3915	2	—	2
<i>S. officinarum</i> x <i>S. robustum</i>				
1st Robustum Nobilisation	Otaheite x 5ING. 63	44	—	0
	Ba. 11569 x 5ING. 63	504	355	40
		548	355	40
<i>S. officinarum</i> x <i>S. spontaneum</i>				
Noble x Local x Glagah	Co. 421 x Self	87	—	15
	Trojan x Pindar	33	11	21
	B. 3439 x Pindar	46	—	21
	B. 51311 x Co. 270	27	—	5
	B. 51355 Polycross	552	—	53
	B. 52298 Polycross	162	—	25
	B. 53200 Polycross	48	—	10
Noble x Local x Glagah x Celebes	Ba. 11569 x B. 48394	9	—	4
		964	11	154
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>				
Noble x Local x Barberi	Trojan x Co. 290	388	42	68
	B. 3365 x CP. 44—101	156	—	19
Noble x Glagah x Barberi	H. 32—8560 x Eros	448	157	226
	H. 32—8560 x B. 4864	402	165	161
	Ba. 11569 x j. 31	10	—	1
	Ba. 11569 x j. 35	88	—	14
	B. 3439 x u. 1331	186	—	42
	B. 37161 x CP. 29—116	16	—	10

APPENDIX II. — *Continued*

GROUP	CROSS	No. PLANTED IN FIELD NURSERY		No. Planted in First Year Seed- ling Trial
		Singles	Bunches	
Noble x Glagah x Barberi Noble x Local x Glagah x Barberi	B. 37161 x j. 3	145	—	32
	Co. 421 x CP. 44—101	37	—	15
	Co. 421 x B. 5411	229	373	168
	Co. 421 x B. 5480	181	—	29
	Co. 421 x B. 54163	729	—	116
	Co. 421 x c. 345	166	—	89
	D. 62/43 x NCo. 310	474	—	52
	D. 62/43 x B. 41227	90	—	21
	H. 32—8560 x Co. 991	56	—	35
	H. 32—8650 x B. 42231	8	—	5
	H. 32—8560 x B. 4738	18	—	10
	H. 32—8560 x B. 4744	37	—	20
	H. 32—8560 x B. 52298	350	—	107
	H. 32—8560 x B. 5301	8	—	4
	PR. 1000 x B. 41227	184	—	15
	PR. 1000 x B. 41276	17	—	6
	PR. 1000 x B. 49257	17	—	5
	PR. 1000 x c. 4144	569	—	64
	Trojan x B. 41227	130	—	63
	Trojan x B. 49119	98	—	34
	Ba. 11569 x NCo. 330	18	—	4
	B. 3365 x Co. 775	47	—	24
	B. 3365 x NCo. 310	21	—	9
	B. 3365 x B. 42231	29	—	6
	B. 3365 x B. 49119	173	—	20
	B. 3439 x NCo. 310	339	307	169
	B. 3439 x Q. 50	288	—	61
	B. 37161 x B. 53200	62	—	23
	B. 37161 x B. 54235	62	—	24
	B. 37161 x c. 4122	12	—	4
	B. 4092 x B. 51134	80	—	20
	B. 40105 x B. 49119	490	97	73
	B. 4145 x NCo. 310	20	—	11
	B. 4145 x B. 4744	55	—	18
	B. 41211 x B. 41227	—	—	12*
	B. 4214 x B. 4098	125	—	23
	B. 42231 x Self	39	—	7
	B. 42279 x B. 49119	47	—	14
	B. 45137 x B. 51355	231	—	13
	B. 4744 x Self	48	—	16
	B. 48361 x B. 4744	80	—	43
	B. 4906 x NCo. 310	29	—	9
	B. 5012 x B. 4738	222	17	50
	B. 5028 x Co. 290	417	86	138
	B. 5028 x Pindar	123	—	42
	B. 50215 x u. 1121	261	—	62
	B. 52315 x B. 4098	312	52	113
	B. 52389 x B. 41211	90	—	30
	B. 52389 x B. 41227	38	—	7
	B. 53267 x B. 42231	95	—	33
	B. 53348 x B. 41211	944	191	320
	B. 53348 x B. 4738	5	—	0
	B. 53348 x B. 49119	120	—	17

APPENDIX II. — *Continued*

GROUP	CROSS	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seed- ling Trial
		Singles	Bunches	
Noble x Local x Glagah x Barberi	B. 54243 x Co. 331	7	—	1
	B. 5650 x B. 4744	353	—	68
	B. 56104 x B. 42231	89	—	29
Noble x Local x Glagah x Celebes x Barberi	F. 36—819 x B. 48177	8	—	4
	PR. 1000 x B. 50377	92	—	11
	B. 3439 x B. 50377	246	116	136
	B. 4145 x B. 50377	12	—	6
	B. 43283 x B. 42231	287	—	42
	B. 43295 x B. 4098	37	—	7
	B. 43295 x B. 47320	49	—	18
	B. 43295 x B. 49119	38	—	3
	B-45137 x B-49380	315	—	26
	B. 50210 x Pindar	285	—	67
	B. 6003 x B. 47320	66	—	11
		12,043	1,603	3,275
<i>S. officinarum x S. spontaneum x</i> <i>S. Sinense</i>				
Noble x Celebes x Sinense	Ba. 11569 x B. 47184	3	—	0
Noble x Local x Sinense	B. 39254 x Co. 270	15	—	9
		18	—	9
<i>S. officinarum x S. barberi x S. sinense</i> <i>x S. spontaneum</i>				
Noble x Barberi x Sinense x Local	B. 3365 x B. 45151	524	—	77
	B. 45152 x B. 45151	147	—	11
Noble x Glagah x Barberi x Sinense	M. 13432 x B. 45116	15	—	7
Noble x Celebes x Barberi x Sinense	B. 39254 x B. 45109	38	—	11
Noble x Local x Glagah x Barberi x Sinense	F. 36—819 x B. 45151	578	—	95
	H. 32—8560 x B. 45151	510	218	138
	H. 32-8560 x B. 54142	70	—	27
	PR. 1000 x B. 51148	251	399	200
	B. 3439 x B. 45151	263	—	38
	B. 37266 x B. 4098	14	—	2
	B. 39254 x B. 42231	206	—	28
	B. 42304 x B. 45151	325	109	128
	B. 4373 x B. 45151	582	—	60
	B. 44111 x B. 4098	494	294	186
	B. 44341 x B. 4098	10	—	2
	B. 45119 x B. 49119	277	—	25
	B. 45152 x F. 31—962	5	—	2
	B. 45152 x NCo. 310	15	—	3
	B. 45152 x B. 4098	380	—	57
	B. 45152 x B. 41211	243	—	53
	B. 45152 x B. 52298	40	—	5
	B. 45154 x B. 45151	607	145	100

APPENDIX II. — *Continued*

GROUP	CROSS	No. PLANTED IN FIELD NURSERY		No. Planted in First Year Seedling Trial
		Singles	Bunches	
Noble x Local x Glagah x Barberi x Sinense	B. 45220 x B. 54163	23	—	8
	B. 48330 x B. 45151	41	—	11
	B. 5012 x B. 45151	161	—	26
	B. 51243 x NCo. 310	26	—	6
	B. 53267 x B. 45151	185	—	37
	B. 53355 x B. 49119	125	—	15
	B. 56104 x B. 45151	269	—	44
Noble x Local x Glagah x Celebes x Barberi x Sinense	B. 50146 x B. 50377	22	—	8
	B. 50210 x B. 45151	32	—	13
	B. 52371 x B. 45151	220	—	44
Noble x Local x Celebes x Barberi x Sinense	B. 43283 x B. 45151	270	269	76
	B. 35247 x B. 45151	324	397	74
Noble x Glagah x Celebes x Barberi x Sinense	B. 45154 x B. 45109	107	—	14
Noble x Dacca x Local x Barberi x Sinense	B. 47399 x B. 4862	28	—	5
		7,427	1,831	1,636
<i>S. officinarum x S. spontaneum x S. robustum</i>				
Noble x Celebes x Robustum	Otaheite x B. 47199	203	—	31
	Ba. 11569 x B. 47157	259	—	79
	Ba. 11569 x B. 47198	37	—	9
Noble x Local x Glagah x Robustum	Trojan x B. 44226	195	—	49
	Trojan x B. 44227	394	—	65
		1,088	—	233
<i>S. officinarum x S. barberi x S. robustum</i>				
Noble x Barberi x Robustum	B. 3365 x 51NG. 63	161	—	34
<i>S. officinarum x S. spontaneum x S. barberi x S. robustum</i>				
Noble x Local x Glagah x Barberi x Robustum	B. 45198 x B. 4744	372	—	62
	B. 53179 x B. 49119	74	—	17
	B. 5652 x B. 49119	323	63	97
Noble x Local x Glagah x Celebes x Barberi x Robustum	B. 50210 x B. 44226	27	—	9
Noble x Local x Barberi x Robustum	B. 46103 x 51NG. 63	40	—	6
		836	63	191

APPENDIX II — *Concluded*

GROUP	CROSS	NO. PLANTED IN FIELD NURSERY		No. Planted in First Year Seed- ling Trial
		Singles	Bunches	
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S.</i> <i>sinense</i> x <i>S. robustum</i> Noble x Glagah x Celebes x Sinense x Robustum	B. 441 x B. 57100	168	—	72
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S.</i> <i>barberi</i> x <i>S. sinense</i> x <i>S. robus-</i> <i>tum</i> Noble x Local x Glagah x Barberi x Sinense x Robustum	B. 5651 x B. 45151 B. 5652 x B. 45151	610 121	— —	117 21
		731	—	138
	GRAND TOTALS	25,641	4,074	6,323

* Hedge Selections.

APPENDIX III

B.61' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

GROUP				CROSS		No. Reaped in First Year Trial	No. Finally Selected (Breed- ing)	% Final Selec- tion
<i>S. officinarum</i>								
Noble	...	...	Ba.11569	x	Badila	7	(1)	14
Noble	...	...	Ba.11569	x	28NG.13	50	(5)	10
						57	6	
<i>S. officinarum</i> x <i>S. spontaneum</i> ...								
3rd Glagah Nobilisation	...		B.3439	x	CP.36—154	12	0	0
5th Glagah	„	...	M.134/32	x	Badila	44	3	7
1st Celebes	„	...	Ba.11569	x	Tabongo	4	(1)	25
3rd Celebes	„	...	B.35247	x	Comus	6	(1)	17
Noble x Local x Glagah	...		Co.421	x	d.251	121	1	1
			Co.421	x	d.2452	55	0	0
			B.37172	x	Pindar	18	1	6
Noble x Local x Celebes x Glagah			Trojan	x	B.46364	6	2	33
Noble x Local x Glagah x Dacca			Trojan	x	B.49224	4	0	0
						270	9	
<i>S. officinarum</i> x <i>S. barberi</i>								
3rd Barberi Nobilisation	...		B.3365	x	CP.36—154	14	(1)	7
4th Barberi	„	...	Ba.11569	x	u.1124	4	0	0
			B.37161	x	Comus	2	0	0
						20	1	
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>								
Noble x Local x Barberi	...		Ba.11569	x	r.3321	34	0	0
			B.3013	x	CP.28—11	13	1	8
			B.37161	x	Co.270	15	1	7
			B.37161	x	CP.28—11	13	0	0
			B.45121	x	Badila	2	1	50
			r.334	x	u.112	3	0	0
			r.14	x	Self	4	1	25
Noble x Glagah x Barberi	...		H.32—8560	x	B.37193	67	7	10
			M.134/32	x	u.1221	4	1	25
			M.134/32	x	u.1421	9	1	11
			POJ.3016	x	B.41227	79	1	1
			Ba.11569	x	V.52107	62	1	6
			B.3439	x	B.37193	67	4	9
			B.35207	x	POJ.2878	32	0	0
			B.35207	x	B.52107	5	1	20
			B.37161	x	Eros	198	9	5

APPENDIX III *Continued*

B. 61' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

GROUP	CROSS	No. Reaped in First Year Trial	No. Finally Selected (Breed- ing)	% Final Selec- tion
Noble x Glagah x Celebes x Barberi	H. 32—8560 x B. 45109	21	0	0
	H. 32—8560 x B. 46364	3	1	33
	B. 5012 x B. 46364	4	0	0
Noble x Glagah x Dacca x Barberi	B. 37161 x B. 49224	48	5	10
Noble x Local x Glagah x Barberi	Co. 421 x B. 4098	39	0	0
	Co. 421 x B. 47320	75	0	0
	Co. 421 x B. 52107	137	9	7
	D. 62/43 x B. 49119	25	2	8
	F. 36—819 x B. 4098	80	1	1
	F. 36—819 x B. 42231	4	0	0
	F. 36—819 x B. 4362	9	1	11
	F. 36—819 x B. 47314	1	0	0
	F. 36—819 x B. 47380	10	1	10
	F. 36—819 x B. 5480	13	0	0
	H. 32—8560 x Pindar	81	1	1
	H. 32—8560 x B. 5121	2	1	50
	M. 134/32 x B. 42231	3	2	67
	PR. 1000 x B. H. 10(12)	3	0	0
	Trojan x B. 49119	8	3	38
	Ba. 11569 x c. 343	6	0	0
	B. 3172 x B. 49119	9	4	44
	B. 3439 x B. 4744	38	4	11
	B. 3439 x B. 49119	66	7	11
	B. 34102 x B. 4744	32	2	6
	B. 35207 x NCo. 330	3	0	0
	B. 35207 x d. 251	4	1	25
	B. 37161 x B. 4098	71	3	4
	B. 37161 x B. 41211	292	18	6
	B. 37161 x B. 4744	1	0	0
	B. 37161 x c. 413	16	1	6
	B. 37161 x d. 2451	19	1	5
	B. 4096 x B. 41227	31	2	6
	B. 4214 x B. 49119	23	4	17
	B. 42231 x Self	16	1	6
	B. 4373 x Pindar	4	1	25
	B. 4373 x B. 42231	17	1	6
	B. 43358 x B. 49119	32	6	19
	B. 45121 x B. 4744	14	2	14
	B. 45137 x B. 41227	131	13	10
	B. 45137 x B. 48392	70	3	4
	B. 45137 x B. 50382	210	3	2
	B. 45137 x B. 5121	96	4	4
	B. 45170 x B. 4744	52	2	4
	B. 45225 x B. 4744	91	3	3
	B. 47386 x B. 4098	158	11	7
	B. 48209 x B. 4744	2	0	0
	B. 49119 x Comus	4	0	0
	B. 49119 x B. 34104	27	2	7
	B. 49282 x B. 4098	16	4	25
	B. 5041 x B. 4738	5	1	20
	B. 5041 x B. 49119	138	15	12
	B. 50135 x Self	45	0	0

APPENDIX III *Continued*

B.61' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

GROUP	CROSS		No. Reaped in First Year Trial	No. Finally Selected (Breed- ing)	% Final Selec- tion
Noble x Local x Glagah x Barberi	B.52184	x B.34104	37	3	8
	B.52222	x Co.270	7	1	14
	B.52222	x B.43229	3	0	0
	B.52389	x B.41227	17	0	0
	B.52389	x B.52107	82	5	6
	B.5336	x B.4098	77	9	12
	B.54243	x B.41227	2	0	0
	B.5650	x B.4098	4	1	25
	t.11	x u.1131	3	0	0
	c.33	x Self	8	0	0
	c.345	x Self	8	0	0
	t.21	x Self	4	1	25
Noble x Local x Glagah x Celebes x Barberi	Co.421	x B.46265	81	4	5
	H.32—8560	x B.43375	7	1	14
	B.39157	x B.4744	4	0	0
	B.39157	x B.49119	2	1	50
	B.43283	x B.4747	43	1	2
	B.43283	x d.251	23	2	9
	B.43380	x B.49119	11	1	10
	B.48165	x B.4744	6	1	17
	B.50210	x B.46364	93	13	14
	B.50210	x B.49119	58	3	5
	B.52321	x B.43375	70	5	7
	B.52371	x B.34104	19	2	10
	B.52371	x d.251	27	0	0
	B.52371	x u.1122	46	1	2
	c.31	x B.46364	26	2	8
Noble x Local x Glagah x Dacca x Barberi	B.4581	x B.4098	7	2	29
	Noble x Glagah x Tukuyu x Barberi	Tukuyu No. 2 x B.41227	14	(2)	14
			3,701	236	
<i>S. officinarum</i> x <i>S. Sinense</i>					
1st Sinense Nobilisation	Merthi	x B.391	1	(1)	100
	Uba	x B.603	3	(2)	67
2nd Sinense „	CH.64/21	x Ba.8069	7	0	0
	B.37226	x Ba.6032	1	0	0
	B.37226	x B.3915	7	(2)	29
			19	5	
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. sinense</i>					
Noble x Glagah x Sinense	b.111	x Self	4	0	0
Noble x Local x Glagah x Sinense	Trojan	x B.51152	5	1	20
	b.441	x d.213	16	0	0

B.61' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

GROUP	CROSS		No. Reaped in First Year Trial	No. Finally Selected (Breed- ing)	% Final Selec- tion.
Noble x Glagah x Celebes x Sinense	b.441	x B.46364	2	0	0
	Otaheite	x B.51152	32	0	0
	Otaheite	x B.51269	26	(3)	12
Noble x Glagah x Sinense	Ba.11569	x B.35276	19	0	0
	Ba.11569	x B.51270	10	1	10
	B.45220	x CP.36—154	62	4	6
	b.1125	x e.2411	45	2	4
			221	11	
<i>S. officinarum x S. spontaneum x S. barberi x S. sinense</i>					
Noble x Local x Barberi x Sinense	B.4214	x B.45151	46	6	13
	B.45121	x B.45151	206	18	9
	B.45152	x Co.270	16	0	0
	B.47329	x B.H.10(12)	2	0	0
Noble x Glagah x Barberi x Sinense	Ba.11569	x B.4543	37	0	0
Noble x Local x Glagah x Barberi x Sinense	Co.421	x B.45151	114	8	7
	H.32—8560	x B.47258	22	3	14
	M.134/32	x B.47258	11	2	18
	PR.1000	x B.47258	189	17	9
	B.37172	x B.47258	7	2	29
	B.39254	x B.4098	6	0	0
	B.40272	x B.4744	32	2	6
	B.40272	x B.5480	5	0	0
	B.45152	x B.43214	4	0	0
	B.47399	x B.3337	3	0	0
	B.48209	x B.54142	17	3	18
	B.5041	x B.54142	23	3	13
	B.51129	x B.45151	7	0	0
	B.51167	x B.45151	10	0	0
Noble x Local x Glagah x Celebes x Barberi x Sinense	B.50210	x B.47258	67	8	12
			824	72	148
<i>S. officinarum x S. spontaneum x S. robustum</i>					
Noble x Celebes x Robustum	Otaheite	x B.47156	38	2	5
Noble x Glagah x Robustum	g.332	x Self	14	1	9
Noble x Local x Glagah x Robustum	Trojan	x B.4524	5	1	20
			57	4	

APPENDIX III *Concluded*

B.61' SERIES

DETAILS OF FINAL SELECTIONS FROM THE FIRST YEAR TRIAL

GROUP	CROSS	No. Reaped in First Year Trial	No. Finally Selected (Breeding)	% Final Selection
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>				
Noble x Local x Glagah x Barberi x Robustum ...	B.4214 x B.51242 B.4455 x B.4098 B.45117 x B.51242 B.48357 x B.4744	58 8 4 2	10 0 0 0	17 0 0 0
Noble x Glagah x Barberi x Robustum ...	B.3439 x H.37—1933 B.37161 x B.51242 a.133 x g.331	28 23 —	2 2 0	7 8 0
		123	14	
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i> x <i>S. robustum</i>				
Noble x Glagah x Barberi x Sinense x Robustum ...	B.48306 x B.37193 B.48306 x B.4098	10 52	0 2	0 4
		62	2	
Open pollinated		62	0	0
GRAND TOTALS		5,416	360	6.6

